KRS axioms

KRS001+0.ax SZS success ontology nodes
$\forall \mathrm{ax}, c\colon ((\neg \exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \Rightarrow \neg \exists i_2\colon \mathrm{model}(i_2, c)) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{unp}))$ fof(unp, axiom)
$\forall \mathrm{ax}, c\colon ((\exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \Rightarrow \exists i_2\colon \mathrm{model}(i_2, c)) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{sap}))$ fof(sap, axiom)
$\forall \mathrm{ax}, c\colon ((\exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \iff \exists i_2\colon \mathrm{model}(i_2, c)) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{esa}))$ fof(esa, axiom)
$\forall \mathrm{ax}, c\colon (\exists i_1\colon (\mathrm{model}(i_1, \mathrm{ax}) \text{ and } \mathrm{model}(i_1, c)) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{sat}))$ fof(sat, axiom)
$\forall \mathrm{ax}, c\colon (\forall i_1\colon (\mathrm{model}(i_1, \mathrm{ax}) \Rightarrow \mathrm{model}(i_1, c)) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{thm}))$ fof(thm, axiom)
$\forall \mathrm{ax}, c\colon ((\exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \text{ and } \forall i_2\colon (\mathrm{model}(i_2, \mathrm{ax}) \iff \mathrm{model}(i_2, c))) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{eqv}))$ fof(eqv, axiom)
$\forall \mathrm{ax}, c\colon ((\exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \text{ and } \forall i_2\colon \mathrm{model}(i_2, c)) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{tac}))$ fof(tac, axiom)
$\forall \mathrm{ax}, c\colon ((\exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \text{ and } \forall i_2\colon (\mathrm{model}(i_2, \mathrm{ax}) \Rightarrow \mathrm{model}(i_2, c)) \text{ and } \exists i_3\colon (\mathrm{model}(i_3, c) \text{ and } \neg \mathrm{model}(i_3, \mathrm{ax}))) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{wec}))$ fof(wec, axiom)
$\forall \mathrm{ax}, c\colon ((\exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \text{ and } \exists i_2\colon \neg \mathrm{model}(i_2, \mathrm{ax}) \text{ and } \forall i_3\colon (\mathrm{model}(i_3, \mathrm{ax}) \iff \mathrm{model}(i_3, c))) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{eth}))$ fo
$\forall \mathrm{ax}, c\colon (\forall i_1\colon (\mathrm{model}(i_1, \mathrm{ax}) \text{ and } \mathrm{model}(i_1, c)) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{tau}))$ fof(tau, axiom)
$\forall \mathrm{ax}, c\colon ((\exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \text{ and } \exists i_2\colon \neg \mathrm{model}(i_2, \mathrm{ax}) \text{ and } \forall i_3\colon \mathrm{model}(i_3, c)) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{wtc}))$ fof(wtc, axiom)
$\forall \mathrm{ax}, c\colon ((\exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \text{ and } \forall i_2\colon (\mathrm{model}(i_2, \mathrm{ax}) \Rightarrow \mathrm{model}(i_2, c)) \text{ and } \exists i_3\colon (\mathrm{model}(i_3, c) \text{ and } \neg \mathrm{model}(i_3, \mathrm{ax})) \text{ and } \exists i_4\colon \neg$ mo
$\mathrm{status}(\mathrm{ax}, c, \mathrm{wth}))$ fof(wth, axiom)
$\forall \mathrm{ax}, c\colon (\neg \exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{cax}))$ fof(cax, axiom)
$\forall \mathrm{ax}, c\colon ((\neg \exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \text{ and } \exists i_2\colon \mathrm{model}(i_2, c)) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{sca}))$ fof(sca, axiom)
$\forall \mathrm{ax}, c\colon ((\neg \exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \text{ and } \forall i_2\colon \mathrm{model}(i_2, c)) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{tca}))$ fof(tca, axiom)
$\forall \mathrm{ax}, c\colon ((\neg \exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \text{ and } \exists i_2\colon \mathrm{model}(i_2, c) \text{ and } \exists i_3\colon \neg \mathrm{model}(i_3, c)) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{wca}))$ fof(wca, axiom)
$\forall \mathrm{ax}, c\colon (\exists i_1\colon (\mathrm{model}(i_1, \mathrm{ax}) \text{ and } \mathrm{model}(i_1, \mathrm{not}(c))) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{csa}))$ fof(csa, axiom)
$\forall \mathrm{ax}, c\colon ((\forall i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \text{ and } \forall i_2\colon \mathrm{model}(i_2, \mathrm{not}(c))) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{uns}))$ fof(uns, axiom)
$\forall \mathrm{ax}, c\colon ((\exists i_1\colon (\mathrm{model}(i_1, \mathrm{ax}) \text{ and } \mathrm{model}(i_1, c)) \text{ and } \exists i_2\colon (\mathrm{model}(i_2, \mathrm{ax}) \text{ and } \mathrm{model}(i_2, \mathrm{not}(c)))) \iff \mathrm{status}(\mathrm{ax}, c, \mathrm{noc}))$ fof(

KRS001+1.ax SZS success ontology node relationships
$\forall s_1, s_2\colon (\exists \mathrm{ax}, c\colon (\mathrm{status}(\mathrm{ax}, c, s_1) \text{ and } \mathrm{status}(\mathrm{ax}, c, s_2)) \iff \mathrm{mighta}(s_1, s_2))$ fof(mighta, axiom)
$\forall s_1, s_2\colon (\forall \mathrm{ax}, c\colon (\mathrm{status}(\mathrm{ax}, c, s_1) \Rightarrow \mathrm{status}(\mathrm{ax}, c, s_2)) \iff \mathrm{isa}(s_1, s_2))$ fof(isa, axiom)
$\forall s_1, s_2\colon (\exists \mathrm{ax}, c\colon (\mathrm{status}(\mathrm{ax}, c, s_1) \text{ and } \neg \mathrm{status}(\mathrm{ax}, c, s_2)) \iff \mathrm{nota}(s_1, s_2))$ fof(nota, axiom)
$\forall s_1, s_2\colon (\forall \mathrm{ax}, c\colon (\mathrm{status}(\mathrm{ax}, c, s_1) \Rightarrow \neg \mathrm{status}(\mathrm{ax}, c, s_2)) \iff \mathrm{nevera}(s_1, s_2))$ fof(nevera, axiom)
$\forall s_1, s_2\colon (\forall \mathrm{ax}, c\colon \mathrm{status}(\mathrm{ax}, c, s_1) < > \mathrm{status}(\mathrm{ax}, c, s_2) \iff \mathrm{xora}(s_1, s_2))$ fof(xora, axiom)
$\forall i, f\colon \mathrm{model}(i, f) < > \mathrm{model}(i, \mathrm{not}(f))$ fof(completeness, axiom)
$\forall i, f\colon (\mathrm{model}(i, f) \iff \neg \mathrm{model}(i, \mathrm{not}(f)))$ fof(not, axiom)
$\exists f\colon \forall i\colon \mathrm{model}(i, f)$ fof(tautology, axiom)
$\exists f\colon (\exists i_1\colon \mathrm{model}(i_1, f) \text{ and } \exists i_2\colon \neg \mathrm{model}(i_2, f))$ fof(satisfiable, axiom)
$\exists f\colon \forall i\colon \neg \mathrm{model}(i, f)$ fof(contradiction, axiom)
$\exists \mathrm{ax}, c\colon (\exists i_1\colon (\mathrm{model}(i_1, \mathrm{ax}) \text{ and } \mathrm{model}(i_1, c)) \text{ and } \exists i_2\colon (\neg \mathrm{model}(i_2, \mathrm{ax}) \text{ or } \neg \mathrm{model}(i_2, c)))$ fof(sat_non_taut_pair, axiom)
$\exists \mathrm{ax}, c\colon (\exists i_1\colon \mathrm{model}(i_1, \mathrm{ax}) \text{ and } \forall i_2\colon (\mathrm{model}(i_2, \mathrm{ax}) \Rightarrow \mathrm{model}(i_2, c)) \text{ and } \exists i_3\colon (\neg \mathrm{model}(i_3, \mathrm{ax}) \text{ and } \mathrm{model}(i_3, c)) \text{ and } \exists i_4\colon \neg$ mod
$\exists i_1, \mathrm{ax}, c\colon (\mathrm{model}(i_1, \mathrm{ax}) \text{ and } \neg \mathrm{model}(i_1, c) \text{ and } \exists i_2\colon \mathrm{model}(i_2, c))$ fof(non_thm_spt, axiom)

KRS problems

KRS001-1.p Paramasivam problem T-Box 1a
e exists.
$e(\mathrm{exist})$ cnf(clause_1, negated_conjecture)
$c(x_1) \Rightarrow \mathrm{r2least}(x_1)$ cnf(clause_2, axiom)
$\mathrm{r2least}(x_1) \Rightarrow c(x_1)$ cnf(clause_3, axiom)
$\mathrm{r2least}(x_1) \Rightarrow \neg\, \mathrm{u1r}_2(x_1) = \mathrm{u1r}_1(x_1)$ cnf(clause_4, axiom)
$\mathrm{r2least}(x_1) \Rightarrow r(x_1, \mathrm{u1r}_1(x_1))$ cnf(clause_5, axiom)
$\mathrm{r2least}(x_1) \Rightarrow r(x_1, \mathrm{u1r}_2(x_1))$ cnf(clause_6, axiom)
$(r(x_1, x_3) \text{ and } r(x_1, x_2)) \Rightarrow (\mathrm{r2least}(x_1) \text{ or } x_3 = x_2)$ cnf(clause_7, axiom)
$d(x_1) \Rightarrow \mathrm{r1most}(x_1)$ cnf(clause_8, axiom)
$\mathrm{r1most}(x_1) \Rightarrow d(x_1)$ cnf(clause_9, axiom)
$(\mathrm{r1most}(x_1) \text{ and } r(x_1, x_3) \text{ and } r(x_1, x_2)) \Rightarrow x_3 = x_2$ cnf(clause_{10}, axiom)
$\mathrm{u3r}_2(x_1) = \mathrm{u3r}_1(x_1) \Rightarrow \mathrm{r1most}(x_1)$ cnf(clause_{11}, axiom)
$\mathrm{r1most}(x_1) \text{ or } r(x_1, \mathrm{u3r}_1(x_1))$ cnf(clause_{12}, axiom)
$\mathrm{r1most}(x_1) \text{ or } r(x_1, \mathrm{u3r}_2(x_1))$ cnf(clause_{13}, axiom)
$e(x_1) \Rightarrow d(x_1)$ cnf(clause_{14}, axiom)
$e(x_1) \Rightarrow c(x_1)$ cnf(clause_{15}, axiom)

$(c(x_1) \text{ and } d(x_1)) \;\Rightarrow\; e(x_1)$ cnf(clause$_{16}$, axiom)

KRS002-1.p Paramasivam problem T-Box 1b
e exists.
$e(\text{exist})$ cnf(clause$_1$, negated_conjecture)
$c(x_1) \;\Rightarrow\; \text{s2least}(x_1)$ cnf(clause$_2$, axiom)
$\text{s2least}(x_1) \;\Rightarrow\; c(x_1)$ cnf(clause$_3$, axiom)
$\text{s2least}(x_1) \;\Rightarrow\; \neg\, \text{u1r}_2(x_1)=\text{u1r}_1(x_1)$ cnf(clause$_4$, axiom)
$\text{s2least}(x_1) \;\Rightarrow\; s(x_1, \text{u1r}_1(x_1))$ cnf(clause$_5$, axiom)
$\text{s2least}(x_1) \;\Rightarrow\; s(x_1, \text{u1r}_2(x_1))$ cnf(clause$_6$, axiom)
$(s(x_1, x_3) \text{ and } s(x_1, x_2)) \;\Rightarrow\; (\text{s2least}(x_1) \text{ or } x_3=x_2)$ cnf(clause$_7$, axiom)
$d(x_1) \;\Rightarrow\; \text{s1most}(x_1)$ cnf(clause$_8$, axiom)
$\text{s1most}(x_1) \;\Rightarrow\; d(x_1)$ cnf(clause$_9$, axiom)
$(\text{s1most}(x_1) \text{ and } s(x_1, x_3) \text{ and } s(x_1, x_2)) \;\Rightarrow\; x_3=x_2$ cnf(clause$_{10}$, axiom)
$\text{u3r}_2(x_1)=\text{u3r}_1(x_1) \;\Rightarrow\; \text{s1most}(x_1)$ cnf(clause$_{11}$, axiom)
$\text{s1most}(x_1) \text{ or } s(x_1, \text{u3r}_1(x_1))$ cnf(clause$_{12}$, axiom)
$\text{s1most}(x_1) \text{ or } s(x_1, \text{u3r}_2(x_1))$ cnf(clause$_{13}$, axiom)
$e(x_1) \;\Rightarrow\; r(x_1, \text{u4r}_2(x_1))$ cnf(clause$_{14}$, axiom)
$(e(x_1) \text{ and } r(x_1, x_2)) \;\Rightarrow\; d(x_2)$ cnf(clause$_{15}$, axiom)
$(e(x_1) \text{ and } r(x_1, x_2)) \;\Rightarrow\; c(x_2)$ cnf(clause$_{16}$, axiom)
$(c(\text{u4r}_1(x_1)) \text{ and } d(\text{u4r}_1(x_1)) \text{ and } r(x_1, x_3)) \;\Rightarrow\; e(x_1)$ cnf(clause$_{17}$, axiom)
$r(x_1, x_3) \;\Rightarrow\; (e(x_1) \text{ or } r(x_1, \text{u4r}_1(x_1)))$ cnf(clause$_{18}$, axiom)

KRS003-1.p Paramasivam problem T-Box 1c
e and f exist.
$e(\text{exist})$ cnf(clause$_1$, negated_conjecture)
$f(\text{exist})$ cnf(clause$_2$, negated_conjecture)
$c(x_1) \;\Rightarrow\; \text{s2least}(x_1)$ cnf(clause$_3$, axiom)
$\text{s2least}(x_1) \;\Rightarrow\; c(x_1)$ cnf(clause$_4$, axiom)
$\text{s2least}(x_1) \;\Rightarrow\; \neg\, \text{u1r}_2(x_1)=\text{u1r}_1(x_1)$ cnf(clause$_5$, axiom)
$\text{s2least}(x_1) \;\Rightarrow\; s(x_1, \text{u1r}_1(x_1))$ cnf(clause$_6$, axiom)
$\text{s2least}(x_1) \;\Rightarrow\; s(x_1, \text{u1r}_2(x_1))$ cnf(clause$_7$, axiom)
$(s(x_1, x_3) \text{ and } s(x_1, x_2)) \;\Rightarrow\; (\text{s2least}(x_1) \text{ or } x_3=x_2)$ cnf(clause$_8$, axiom)
$d(x_1) \;\Rightarrow\; \text{s1most}(x_1)$ cnf(clause$_9$, axiom)
$\text{s1most}(x_1) \;\Rightarrow\; d(x_1)$ cnf(clause$_{10}$, axiom)
$(\text{s1most}(x_1) \text{ and } s(x_1, x_3) \text{ and } s(x_1, x_2)) \;\Rightarrow\; x_3=x_2$ cnf(clause$_{11}$, axiom)
$\text{u3r}_2(x_1)=\text{u3r}_1(x_1) \;\Rightarrow\; \text{s1most}(x_1)$ cnf(clause$_{12}$, axiom)
$\text{s1most}(x_1) \text{ or } s(x_1, \text{u3r}_1(x_1))$ cnf(clause$_{13}$, axiom)
$\text{s1most}(x_1) \text{ or } s(x_1, \text{u3r}_2(x_1))$ cnf(clause$_{14}$, axiom)
$e(x_1) \;\Rightarrow\; c(x_1)$ cnf(clause$_{15}$, axiom)
$f(x_1) \;\Rightarrow\; d(x_1)$ cnf(clause$_{16}$, axiom)

KRS003_1.p Paramasivam problem T-Box 1c
e and f exist.
unreal: \$tType tff(unreal_type, type)
real: \$tType tff(real_type, type)
u1r_1: unreal → real tff(u1r1_type, type)
u1r_2: unreal → real tff(u1r2_type, type)
u3r_1: unreal → real tff(u3r1_type, type)
u3r_2: unreal → real tff(u3r2_type, type)
exist: unreal tff(exist_type, type)
f: unreal → \$o tff(f_type, type)
d: unreal → \$o tff(d_type, type)
e: unreal → \$o tff(e_type, type)
s1most: unreal → \$o tff(s1most_type, type)
s: (unreal × real) → \$o tff(s_type, type)
c: unreal → \$o tff(c_type, type)
= : (real × real) → \$o tff(equalish_type, type)
s2least: unreal → \$o tff(s2least_type, type)
$\forall x_1$: unreal: $(c(x_1) \;\Rightarrow\; \text{s2least}(x_1))$ tff(clause$_3$, axiom)
$\forall x_1$: unreal: $(\text{s2least}(x_1) \;\Rightarrow\; c(x_1))$ tff(clause$_4$, axiom)

$\forall x_1$: unreal: $\neg$ s2least(x_1) and u1r$_2$(x_1)=u1r$_1$(x_1) tff(clause$_5$, axiom)
$\forall x_1$: unreal: (s2least(x_1) $\Rightarrow$ s(x_1, u1r$_1$(x_1))) tff(clause$_6$, axiom)
$\forall x_1$: unreal: (s2least(x_1) $\Rightarrow$ s(x_1, u1r$_2$(x_1))) tff(clause$_7$, axiom)
$\forall x_2$: real, x_3: real, x_1: unreal: (($s(x_1, x_3)$ and $s(x_1, x_2)$) $\Rightarrow$ (s2least(x_1) or x_3=x_2)) tff(clause$_8$, axiom)
$\forall x_1$: unreal: ($d(x_1)$ $\Rightarrow$ s1most(x_1)) tff(clause$_9$, axiom)
$\forall x_1$: unreal: (s1most(x_1) $\Rightarrow$ $d(x_1)$) tff(clause$_{10}$, axiom)
$\forall x_2$: real, x_3: real, x_1: unreal: ((s1most(x_1) and $s(x_1, x_3)$ and $s(x_1, x_2)$) $\Rightarrow$ x_3=x_2) tff(clause$_{11}$, axiom)
$\forall x_1$: unreal: (u3r$_2$(x_1)=u3r$_1$(x_1) $\Rightarrow$ s1most(x_1)) tff(clause$_{12}$, axiom)
$\forall x_1$: unreal: (s1most(x_1) or s(x_1, u3r$_1$(x_1))) tff(clause$_{13}$, axiom)
$\forall x_1$: unreal: (s1most(x_1) or s(x_1, u3r$_2$(x_1))) tff(clause$_{14}$, axiom)
$\forall x_1$: unreal: ($e(x_1)$ $\Rightarrow$ $c(x_1)$) tff(clause$_{15}$, axiom)
$\forall x_1$: unreal: ($f(x_1)$ $\Rightarrow$ $d(x_1)$) tff(clause$_{16}$, axiom)
$\neg e$(exist) or $\neg f$(exist) tff(clause_1__clause$_2$, conjecture)

KRS004-1.p Paramasivam problem T-Box 1d
c exists.
c(exist) cnf(clause$_1$, negated_conjecture)
$c(x_1)$ $\Rightarrow$ $d(x_1)$ cnf(clause$_2$, axiom)
$c(x_1)$ $\Rightarrow$ $\neg d(x_1)$ cnf(clause$_3$, axiom)
$d(x_1)$ $\Rightarrow$ $\neg c(x_1)$ cnf(clause$_4$, axiom)

KRS005-1.p Paramasivam problem T-Box 2a
Inconsistent concept definition; e exists.
e(exist) cnf(clause$_1$, negated_conjecture)
($e(x_1)$ and $r(x_1, x_5)$) $\Rightarrow$ x_5=u0r$_4$(x_1) cnf(clause$_2$, axiom)
$e(x_1)$ $\Rightarrow$ r(x_1, u0r$_4$(x_1)) cnf(clause$_3$, axiom)
$e(x_1)$ $\Rightarrow$ $\neg$ u0r$_3$(x_1)=u0r$_2$(x_1) cnf(clause$_4$, axiom)
$e(x_1)$ $\Rightarrow$ r(x_1, u0r$_2$(x_1)) cnf(clause$_5$, axiom)
$e(x_1)$ $\Rightarrow$ r(x_1, u0r$_3$(x_1)) cnf(clause$_6$, axiom)
($r(x_1, x_3)$ and $r(x_1, x_2)$ and $r(x_1, x_4)$ and u0r$_1$(x_4, x_1)=x_4) $\Rightarrow$ ($e(x_1)$ or x_3=x_2) cnf(clause$_7$, axiom)
($r(x_1, x_3)$ and $r(x_1, x_2)$ and $r(x_1, x_4)$) $\Rightarrow$ ($e(x_1)$ or x_3=x_2 or r(x_1, u0r$_1$(x_4, x_1))) cnf(clause$_8$, axiom)

KRS006-1.p Paramasivam problem T-Box 2b
Inconsistent concept definition with disjoint concepts.
e(exist) cnf(clause$_1$, negated_conjecture)
r1most(exist) cnf(clause$_2$, negated_conjecture)
r(exist, u4r$_1$(exist)) cnf(clause$_3$, negated_conjecture)
d(u4r$_2$(exist)) cnf(clause$_4$, negated_conjecture)
c(u4r$_1$(exist)) cnf(clause$_5$, negated_conjecture)
$c(x_1)$ $\Rightarrow$ s2least(x_1) cnf(clause$_6$, axiom)
s2least(x_1) $\Rightarrow$ $c(x_1)$ cnf(clause$_7$, axiom)
s2least(x_1) $\Rightarrow$ $\neg$ u1r$_2$(x_1)=u1r$_1$(x_1) cnf(clause$_8$, axiom)
s2least(x_1) $\Rightarrow$ s(x_1, u1r$_1$(x_1)) cnf(clause$_9$, axiom)
s2least(x_1) $\Rightarrow$ s(x_1, u1r$_2$(x_1)) cnf(clause$_{10}$, axiom)
($s(x_1, x_3)$ and $s(x_1, x_2)$) $\Rightarrow$ (s2least(x_1) or x_3=x_2) cnf(clause$_{11}$, axiom)
$d(x_1)$ $\Rightarrow$ s1most(x_1) cnf(clause$_{12}$, axiom)
s1most(x_1) $\Rightarrow$ $d(x_1)$ cnf(clause$_{13}$, axiom)
(s1most(x_1) and $s(x_1, x_3)$ and $s(x_1, x_2)$) $\Rightarrow$ x_3=x_2 cnf(clause$_{14}$, axiom)
u3r$_2$(x_1)=u3r$_1$(x_1) $\Rightarrow$ s1most(x_1) cnf(clause$_{15}$, axiom)
s1most(x_1) or s(x_1, u3r$_1$(x_1)) cnf(clause$_{16}$, axiom)
s1most(x_1) or s(x_1, u3r$_2$(x_1)) cnf(clause$_{17}$, axiom)
$e(x_1)$ $\Rightarrow$ d(u4r$_2$(x_1)) cnf(clause$_{18}$, axiom)
$e(x_1)$ $\Rightarrow$ r(x_1, u4r$_2$(x_1)) cnf(clause$_{19}$, axiom)
$e(x_1)$ $\Rightarrow$ c(u4r$_1$(x_1)) cnf(clause$_{20}$, axiom)
$e(x_1)$ $\Rightarrow$ r(x_1, u4r$_1$(x_1)) cnf(clause$_{21}$, axiom)
$e(x_1)$ $\Rightarrow$ r1most(x_1) cnf(clause$_{22}$, axiom)
(r1most(x_1) and $r(x_1, x_2)$ and $c(x_2)$ and $r(x_1, x_3)$ and $d(x_3)$) $\Rightarrow$ $e(x_1)$ cnf(clause$_{23}$, axiom)
(r1most(x_1) and $r(x_1, x_3)$ and $r(x_1, x_2)$) $\Rightarrow$ x_3=x_2 cnf(clause$_{24}$, axiom)
u5r$_2$(x_1)=u5r$_1$(x_1) $\Rightarrow$ r1most(x_1) cnf(clause$_{25}$, axiom)
r1most(x_1) or r(x_1, u5r$_1$(x_1)) cnf(clause$_{26}$, axiom)
r1most(x_1) or r(x_1, u5r$_2$(x_1)) cnf(clause$_{27}$, axiom)

KRS007-1.p Paramasivam problem T-Box 3a
f subsumes e.
$e(\text{exist})$ cnf(clause$_1$, negated_conjecture)
$\neg f(\text{exist})$ cnf(clause$_2$, negated_conjecture)
$c(x_1) \Rightarrow \text{s2least}(x_1)$ cnf(clause$_3$, axiom)
$\text{s2least}(x_1) \Rightarrow c(x_1)$ cnf(clause$_4$, axiom)
$\text{s2least}(x_1) \Rightarrow \neg\, \text{u1r}_2(x_1)=\text{u1r}_1(x_1)$ cnf(clause$_5$, axiom)
$\text{s2least}(x_1) \Rightarrow s(x_1, \text{u1r}_1(x_1))$ cnf(clause$_6$, axiom)
$\text{s2least}(x_1) \Rightarrow s(x_1, \text{u1r}_2(x_1))$ cnf(clause$_7$, axiom)
$(s(x_1, x_3) \text{ and } s(x_1, x_2)) \Rightarrow (\text{s2least}(x_1) \text{ or } x_3=x_2)$ cnf(clause$_8$, axiom)
$d(x_1) \Rightarrow \text{s1most}(x_1)$ cnf(clause$_9$, axiom)
$\text{s1most}(x_1) \Rightarrow d(x_1)$ cnf(clause$_{10}$, axiom)
$(\text{s1most}(x_1) \text{ and } s(x_1, x_3) \text{ and } s(x_1, x_2)) \Rightarrow x_3=x_2$ cnf(clause$_{11}$, axiom)
$\text{u3r}_2(x_1)=\text{u3r}_1(x_1) \Rightarrow \text{s1most}(x_1)$ cnf(clause$_{12}$, axiom)
$\text{s1most}(x_1) \text{ or } s(x_1, \text{u3r}_1(x_1))$ cnf(clause$_{13}$, axiom)
$\text{s1most}(x_1) \text{ or } s(x_1, \text{u3r}_2(x_1))$ cnf(clause$_{14}$, axiom)
$e(x_1) \Rightarrow d(\text{u4r}_3(x_1))$ cnf(clause$_{15}$, axiom)
$e(x_1) \Rightarrow r(x_1, \text{u4r}_3(x_1))$ cnf(clause$_{16}$, axiom)
$e(x_1) \Rightarrow c(\text{u4r}_2(x_1))$ cnf(clause$_{17}$, axiom)
$e(x_1) \Rightarrow r(x_1, \text{u4r}_2(x_1))$ cnf(clause$_{18}$, axiom)
$e(x_1) \Rightarrow r(x_1, \text{u4r}_1(x_1))$ cnf(clause$_{19}$, axiom)
$(r(x_1, x_2) \text{ and } r(x_1, x_3) \text{ and } c(x_3) \text{ and } r(x_1, x_4) \text{ and } d(x_4)) \Rightarrow e(x_1)$ cnf(clause$_{20}$, axiom)
$f(x_1) \Rightarrow \text{r2least}(x_1)$ cnf(clause$_{21}$, axiom)
$\text{r2least}(x_1) \Rightarrow f(x_1)$ cnf(clause$_{22}$, axiom)
$\text{r2least}(x_1) \Rightarrow \neg\, \text{u6r}_2(x_1)=\text{u6r}_1(x_1)$ cnf(clause$_{23}$, axiom)
$\text{r2least}(x_1) \Rightarrow r(x_1, \text{u6r}_1(x_1))$ cnf(clause$_{24}$, axiom)
$\text{r2least}(x_1) \Rightarrow r(x_1, \text{u6r}_2(x_1))$ cnf(clause$_{25}$, axiom)
$(r(x_1, x_3) \text{ and } r(x_1, x_2)) \Rightarrow (\text{r2least}(x_1) \text{ or } x_3=x_2)$ cnf(clause$_{26}$, axiom)

KRS009-1.p Paramasivam problem T-Box 3c
e exists.
$e(\text{exist})$ cnf(clause$_1$, negated_conjecture)
$c(x_1) \Rightarrow \text{p2least}(x_1)$ cnf(clause$_2$, axiom)
$\text{p2least}(x_1) \Rightarrow c(x_1)$ cnf(clause$_3$, axiom)
$\text{p2least}(x_1) \Rightarrow \neg\, \text{u1r}_2(x_1)=\text{u1r}_1(x_1)$ cnf(clause$_4$, axiom)
$\text{p2least}(x_1) \Rightarrow p(x_1, \text{u1r}_1(x_1))$ cnf(clause$_5$, axiom)
$\text{p2least}(x_1) \Rightarrow p(x_1, \text{u1r}_2(x_1))$ cnf(clause$_6$, axiom)
$(p(x_1, x_3) \text{ and } p(x_1, x_2)) \Rightarrow (\text{p2least}(x_1) \text{ or } x_3=x_2)$ cnf(clause$_7$, axiom)
$d(x_1) \Rightarrow \text{p1most}(x_1)$ cnf(clause$_8$, axiom)
$\text{p1most}(x_1) \Rightarrow d(x_1)$ cnf(clause$_9$, axiom)
$(\text{p1most}(x_1) \text{ and } p(x_1, x_3) \text{ and } p(x_1, x_2)) \Rightarrow x_3=x_2$ cnf(clause$_{10}$, axiom)
$\text{u3r}_2(x_1)=\text{u3r}_1(x_1) \Rightarrow \text{p1most}(x_1)$ cnf(clause$_{11}$, axiom)
$\text{p1most}(x_1) \text{ or } p(x_1, \text{u3r}_1(x_1))$ cnf(clause$_{12}$, axiom)
$\text{p1most}(x_1) \text{ or } p(x_1, \text{u3r}_2(x_1))$ cnf(clause$_{13}$, axiom)
$a(x_1) \Rightarrow (c(x_1) \text{ or } d(x_1))$ cnf(clause$_{14}$, axiom)
$d(x_1) \Rightarrow a(x_1)$ cnf(clause$_{15}$, axiom)
$c(x_1) \Rightarrow a(x_1)$ cnf(clause$_{16}$, axiom)
$r(x_1, x_2) \Rightarrow c(x_2)$ cnf(clause$_{17}$, axiom)
$r(x_1, x_2) \Rightarrow t(x_1, x_2)$ cnf(clause$_{18}$, axiom)
$s(x_1, x_2) \Rightarrow d(x_2)$ cnf(clause$_{19}$, axiom)
$s(x_1, x_2) \Rightarrow t(x_1, x_2)$ cnf(clause$_{20}$, axiom)
$e(x_1) \Rightarrow \text{s1most}(x_1)$ cnf(clause$_{21}$, axiom)
$e(x_1) \Rightarrow \text{r1most}(x_1)$ cnf(clause$_{22}$, axiom)
$e(x_1) \Rightarrow \text{t3least}(x_1)$ cnf(clause$_{23}$, axiom)
$(e(x_1) \text{ and } t(x_1, x_2)) \Rightarrow a(x_2)$ cnf(clause$_{24}$, axiom)
$(a(\text{u7r}_1(x_1)) \text{ and } \text{t3least}(x_1) \text{ and } \text{r1most}(x_1) \text{ and } \text{s1most}(x_1)) \Rightarrow e(x_1)$ cnf(clause$_{25}$, axiom)
$(\text{t3least}(x_1) \text{ and } \text{r1most}(x_1) \text{ and } \text{s1most}(x_1)) \Rightarrow (e(x_1) \text{ or } t(x_1, \text{u7r}_1(x_1)))$ cnf(clause$_{26}$, axiom)
$\text{t3least}(x_1) \Rightarrow \neg\, \text{u8r}_2(x_1)=\text{u8r}_1(x_1)$ cnf(clause$_{27}$, axiom)
$\text{t3least}(x_1) \Rightarrow \neg\, \text{u8r}_3(x_1)=\text{u8r}_1(x_1)$ cnf(clause$_{28}$, axiom)
$\text{t3least}(x_1) \Rightarrow \neg\, \text{u8r}_3(x_1)=\text{u8r}_2(x_1)$ cnf(clause$_{29}$, axiom)

$\mathrm{t3least}(x_1) \Rightarrow t(x_1, \mathrm{u8r_1}(x_1))$ cnf(clause_{30}, axiom)
$\mathrm{t3least}(x_1) \Rightarrow t(x_1, \mathrm{u8r_2}(x_1))$ cnf(clause_{31}, axiom)
$\mathrm{t3least}(x_1) \Rightarrow t(x_1, \mathrm{u8r_3}(x_1))$ cnf(clause_{32}, axiom)
$(t(x_1, x_4) \text{ and } t(x_1, x_3) \text{ and } t(x_1, x_2)) \Rightarrow (\mathrm{t3least}(x_1) \text{ or } x_4{=}x_3 \text{ or } x_4{=}x_2 \text{ or } x_3{=}x_2)$ cnf(clause_{33}, axiom)
$(\mathrm{r1most}(x_1) \text{ and } r(x_1, x_3) \text{ and } r(x_1, x_2)) \Rightarrow x_3{=}x_2$ cnf(clause_{34}, axiom)
$\mathrm{u9r_2}(x_1){=}\mathrm{u9r_1}(x_1) \Rightarrow \mathrm{r1most}(x_1)$ cnf(clause_{35}, axiom)
$\mathrm{r1most}(x_1) \text{ or } r(x_1, \mathrm{u9r_1}(x_1))$ cnf(clause_{36}, axiom)
$\mathrm{r1most}(x_1) \text{ or } r(x_1, \mathrm{u9r_2}(x_1))$ cnf(clause_{37}, axiom)
$(\mathrm{s1most}(x_1) \text{ and } s(x_1, x_3) \text{ and } s(x_1, x_2)) \Rightarrow x_3{=}x_2$ cnf(clause_{38}, axiom)
$\mathrm{u10r_2}(x_1){=}\mathrm{u10r_1}(x_1) \Rightarrow \mathrm{s1most}(x_1)$ cnf(clause_{39}, axiom)
$\mathrm{s1most}(x_1) \text{ or } s(x_1, \mathrm{u10r_1}(x_1))$ cnf(clause_{40}, axiom)
$\mathrm{s1most}(x_1) \text{ or } s(x_1, \mathrm{u10r_2}(x_1))$ cnf(clause_{41}, axiom)

KRS010-1.p Paramasivam problem T-Box 3d
f subsumes e.
$e(\mathrm{exist})$ cnf(clause_1, negated_conjecture)
$\neg f(\mathrm{exist})$ cnf(clause_2, negated_conjecture)
$a(x_1) \Rightarrow (c(x_1) \text{ or } d(x_1))$ cnf(clause_3, axiom)
$d(x_1) \Rightarrow a(x_1)$ cnf(clause_4, axiom)
$c(x_1) \Rightarrow a(x_1)$ cnf(clause_5, axiom)
$(e(x_1) \text{ and } r(x_1, x_4) \text{ and } r(x_1, x_3) \text{ and } c(x_4) \text{ and } c(x_3)) \Rightarrow x_4{=}x_3$ cnf(clause_6, axiom)
$e(x_1) \Rightarrow \mathrm{r3least}(x_1)$ cnf(clause_7, axiom)
$(e(x_1) \text{ and } r(x_1, x_2)) \Rightarrow a(x_2)$ cnf(clause_8, axiom)
$(a(\mathrm{u1r_1}(x_1)) \text{ and } \mathrm{r3least}(x_1) \text{ and } \mathrm{u1r_3}(x_1){=}\mathrm{u1r_2}(x_1)) \Rightarrow e(x_1)$ cnf(clause_9, axiom)
$(a(\mathrm{u1r_1}(x_1)) \text{ and } \mathrm{r3least}(x_1)) \Rightarrow (e(x_1) \text{ or } c(\mathrm{u1r_2}(x_1)))$ cnf(clause_{10}, axiom)
$(a(\mathrm{u1r_1}(x_1)) \text{ and } \mathrm{r3least}(x_1)) \Rightarrow (e(x_1) \text{ or } c(\mathrm{u1r_3}(x_1)))$ cnf(clause_{11}, axiom)
$(a(\mathrm{u1r_1}(x_1)) \text{ and } \mathrm{r3least}(x_1)) \Rightarrow (e(x_1) \text{ or } r(x_1, \mathrm{u1r_2}(x_1)))$ cnf(clause_{12}, axiom)
$(a(\mathrm{u1r_1}(x_1)) \text{ and } \mathrm{r3least}(x_1)) \Rightarrow (e(x_1) \text{ or } r(x_1, \mathrm{u1r_3}(x_1)))$ cnf(clause_{13}, axiom)
$(\mathrm{r3least}(x_1) \text{ and } \mathrm{u1r_3}(x_1){=}\mathrm{u1r_2}(x_1)) \Rightarrow (e(x_1) \text{ or } r(x_1, \mathrm{u1r_1}(x_1)))$ cnf(clause_{14}, axiom)
$\mathrm{r3least}(x_1) \Rightarrow (e(x_1) \text{ or } r(x_1, \mathrm{u1r_1}(x_1)) \text{ or } c(\mathrm{u1r_2}(x_1)))$ cnf(clause_{15}, axiom)
$\mathrm{r3least}(x_1) \Rightarrow (e(x_1) \text{ or } r(x_1, \mathrm{u1r_1}(x_1)) \text{ or } c(\mathrm{u1r_3}(x_1)))$ cnf(clause_{16}, axiom)
$\mathrm{r3least}(x_1) \Rightarrow (e(x_1) \text{ or } r(x_1, \mathrm{u1r_1}(x_1)) \text{ or } r(x_1, \mathrm{u1r_2}(x_1)))$ cnf(clause_{17}, axiom)
$\mathrm{r3least}(x_1) \Rightarrow (e(x_1) \text{ or } r(x_1, \mathrm{u1r_1}(x_1)) \text{ or } r(x_1, \mathrm{u1r_3}(x_1)))$ cnf(clause_{18}, axiom)
$\mathrm{r3least}(x_1) \Rightarrow \neg\, \mathrm{u2r_2}(x_1){=}\mathrm{u2r_1}(x_1)$ cnf(clause_{19}, axiom)
$\mathrm{r3least}(x_1) \Rightarrow \neg\, \mathrm{u2r_3}(x_1){=}\mathrm{u2r_1}(x_1)$ cnf(clause_{20}, axiom)
$\mathrm{r3least}(x_1) \Rightarrow \neg\, \mathrm{u2r_3}(x_1){=}\mathrm{u2r_2}(x_1)$ cnf(clause_{21}, axiom)
$\mathrm{r3least}(x_1) \Rightarrow r(x_1, \mathrm{u2r_1}(x_1))$ cnf(clause_{22}, axiom)
$\mathrm{r3least}(x_1) \Rightarrow r(x_1, \mathrm{u2r_2}(x_1))$ cnf(clause_{23}, axiom)
$\mathrm{r3least}(x_1) \Rightarrow r(x_1, \mathrm{u2r_3}(x_1))$ cnf(clause_{24}, axiom)
$(r(x_1, x_4) \text{ and } r(x_1, x_3) \text{ and } r(x_1, x_2)) \Rightarrow (\mathrm{r3least}(x_1) \text{ or } x_4{=}x_3 \text{ or } x_4{=}x_2 \text{ or } x_3{=}x_2)$ cnf(clause_{25}, axiom)
$f(x_1) \Rightarrow d(\mathrm{u3r_1}(x_1))$ cnf(clause_{26}, axiom)
$f(x_1) \Rightarrow d(\mathrm{u3r_2}(x_1))$ cnf(clause_{27}, axiom)
$f(x_1) \Rightarrow \neg\, \mathrm{u3r_2}(x_1){=}\mathrm{u3r_1}(x_1)$ cnf(clause_{28}, axiom)
$f(x_1) \Rightarrow r(x_1, \mathrm{u3r_1}(x_1))$ cnf(clause_{29}, axiom)
$f(x_1) \Rightarrow r(x_1, \mathrm{u3r_2}(x_1))$ cnf(clause_{30}, axiom)
$(r(x_1, x_3) \text{ and } r(x_1, x_2) \text{ and } d(x_3) \text{ and } d(x_2)) \Rightarrow (f(x_1) \text{ or } x_3{=}x_2)$ cnf(clause_{31}, axiom)

KRS012-1.p Paramasivam problem T-Box 4a
f subsumes c.
$c(\mathrm{exists})$ cnf(clause_1, negated_conjecture)
$\neg f(\mathrm{exists})$ cnf(clause_2, negated_conjecture)
$(c(x_1) \text{ and } r(x_1, x_3) \text{ and } d(x_3)) \Rightarrow e(x_3)$ cnf(clause_3, axiom)
$(c(x_1) \text{ and } r(x_1, x_2)) \Rightarrow d(x_2)$ cnf(clause_4, axiom)
$(d(\mathrm{u0r_1}(x_1)) \text{ and } e(\mathrm{u0r_2}(x_1))) \Rightarrow c(x_1)$ cnf(clause_5, axiom)
$d(\mathrm{u0r_1}(x_1)) \Rightarrow (c(x_1) \text{ or } d(\mathrm{u0r_2}(x_1)))$ cnf(clause_6, axiom)
$d(\mathrm{u0r_1}(x_1)) \Rightarrow (c(x_1) \text{ or } r(x_1, \mathrm{u0r_2}(x_1)))$ cnf(clause_7, axiom)
$e(\mathrm{u0r_2}(x_1)) \Rightarrow (c(x_1) \text{ or } r(x_1, \mathrm{u0r_1}(x_1)))$ cnf(clause_8, axiom)
$c(x_1) \text{ or } r(x_1, \mathrm{u0r_1}(x_1)) \text{ or } d(\mathrm{u0r_2}(x_1))$ cnf(clause_9, axiom)
$c(x_1) \text{ or } r(x_1, \mathrm{u0r_1}(x_1)) \text{ or } r(x_1, \mathrm{u0r_2}(x_1))$ cnf(clause_{10}, axiom)
$(f(x_1) \text{ and } r(x_1, x_2)) \Rightarrow e(x_2)$ cnf(clause_{11}, axiom)

$e(\mathrm{u1r_1}(x_1)) \Rightarrow f(x_1)$ cnf(clause$_{12}$, axiom)
$f(x_1)$ or $r(x_1, \mathrm{u1r_1}(x_1))$ cnf(clause$_{13}$, axiom)

KRS013-1.p Paramasivam problem T-Box 4b
f subsumes e.
$e(\mathrm{exist})$ cnf(clause$_1$, negated_conjecture)
$\neg f(\mathrm{exist})$ cnf(clause$_2$, negated_conjecture)
$c(x_1) \Rightarrow \mathrm{t2least}(x_1)$ cnf(clause$_3$, axiom)
$\mathrm{t2least}(x_1) \Rightarrow c(x_1)$ cnf(clause$_4$, axiom)
$\mathrm{t2least}(x_1) \Rightarrow \neg\, \mathrm{u1r_2}(x_1){=}\mathrm{u1r_1}(x_1)$ cnf(clause$_5$, axiom)
$\mathrm{t2least}(x_1) \Rightarrow t(x_1, \mathrm{u1r_1}(x_1))$ cnf(clause$_6$, axiom)
$\mathrm{t2least}(x_1) \Rightarrow t(x_1, \mathrm{u1r_2}(x_1))$ cnf(clause$_7$, axiom)
$(t(x_1, x_3)$ and $t(x_1, x_2)) \Rightarrow (\mathrm{t2least}(x_1)$ or $x_3{=}x_2)$ cnf(clause$_8$, axiom)
$d(x_1) \Rightarrow \mathrm{t1most}(x_1)$ cnf(clause$_9$, axiom)
$\mathrm{t1most}(x_1) \Rightarrow d(x_1)$ cnf(clause$_{10}$, axiom)
$(\mathrm{t1most}(x_1)$ and $t(x_1, x_3)$ and $t(x_1, x_2)) \Rightarrow x_3{=}x_2$ cnf(clause$_{11}$, axiom)
$\mathrm{u3r_2}(x_1){=}\mathrm{u3r_1}(x_1) \Rightarrow \mathrm{t1most}(x_1)$ cnf(clause$_{12}$, axiom)
$\mathrm{t1most}(x_1)$ or $t(x_1, \mathrm{u3r_1}(x_1))$ cnf(clause$_{13}$, axiom)
$\mathrm{t1most}(x_1)$ or $t(x_1, \mathrm{u3r_2}(x_1))$ cnf(clause$_{14}$, axiom)
$(e(x_1)$ and $r(x_1, x_3)) \Rightarrow d(x_3)$ cnf(clause$_{15}$, axiom)
$(e(x_1)$ and $r(x_1, x_2)$ and $\mathrm{s2least}(x_2)) \Rightarrow c(x_2)$ cnf(clause$_{16}$, axiom)
$(c(\mathrm{u4r_1}(x_1))$ and $d(\mathrm{u4r_2}(x_1))) \Rightarrow e(x_1)$ cnf(clause$_{17}$, axiom)
$c(\mathrm{u4r_1}(x_1)) \Rightarrow (e(x_1)$ or $r(x_1, \mathrm{u4r_2}(x_1)))$ cnf(clause$_{18}$, axiom)
$d(\mathrm{u4r_2}(x_1)) \Rightarrow (e(x_1)$ or $\mathrm{s2least}(\mathrm{u4r_1}(x_1)))$ cnf(clause$_{19}$, axiom)
$e(x_1)$ or $\mathrm{s2least}(\mathrm{u4r_1}(x_1))$ or $r(x_1, \mathrm{u4r_2}(x_1))$ cnf(clause$_{20}$, axiom)
$d(\mathrm{u4r_2}(x_1)) \Rightarrow (e(x_1)$ or $r(x_1, \mathrm{u4r_1}(x_1)))$ cnf(clause$_{21}$, axiom)
$e(x_1)$ or $r(x_1, \mathrm{u4r_1}(x_1))$ or $r(x_1, \mathrm{u4r_2}(x_1))$ cnf(clause$_{22}$, axiom)
$\mathrm{s2least}(x_1) \Rightarrow \neg\, \mathrm{u5r_2}(x_1){=}\mathrm{u5r_1}(x_1)$ cnf(clause$_{23}$, axiom)
$\mathrm{s2least}(x_1) \Rightarrow s(x_1, \mathrm{u5r_1}(x_1))$ cnf(clause$_{24}$, axiom)
$\mathrm{s2least}(x_1) \Rightarrow s(x_1, \mathrm{u5r_2}(x_1))$ cnf(clause$_{25}$, axiom)
$(s(x_1, x_3)$ and $s(x_1, x_2)) \Rightarrow (\mathrm{s2least}(x_1)$ or $x_3{=}x_2)$ cnf(clause$_{26}$, axiom)
$(f(x_1)$ and $r(x_1, x_2)) \Rightarrow \mathrm{s1most}(x_2)$ cnf(clause$_{27}$, axiom)
$\mathrm{s1most}(\mathrm{u6r_1}(x_1)) \Rightarrow f(x_1)$ cnf(clause$_{28}$, axiom)
$f(x_1)$ or $r(x_1, \mathrm{u6r_1}(x_1))$ cnf(clause$_{29}$, axiom)
$(\mathrm{s1most}(x_1)$ and $s(x_1, x_3)$ and $s(x_1, x_2)) \Rightarrow x_3{=}x_2$ cnf(clause$_{30}$, axiom)
$\mathrm{u7r_2}(x_1){=}\mathrm{u7r_1}(x_1) \Rightarrow \mathrm{s1most}(x_1)$ cnf(clause$_{31}$, axiom)
$\mathrm{s1most}(x_1)$ or $s(x_1, \mathrm{u7r_1}(x_1))$ cnf(clause$_{32}$, axiom)
$\mathrm{s1most}(x_1)$ or $s(x_1, \mathrm{u7r_2}(x_1))$ cnf(clause$_{33}$, axiom)

KRS014-1.p Paramasivam problem T-Box 5a
e exists.
$e(\mathrm{exists})$ cnf(clause$_1$, negated_conjecture)
$(e(x_1)$ and $r(x_1, x_2)) \Rightarrow s(x_1, x_2)$ cnf(clause$_2$, axiom)
$(e(x_1)$ and $s(x_1, x_2)) \Rightarrow r(x_1, x_2)$ cnf(clause$_3$, axiom)
$e(x_1) \Rightarrow \mathrm{s2exact}(x_1)$ cnf(clause$_4$, axiom)
$e(x_1) \Rightarrow \mathrm{r1exact}(x_1)$ cnf(clause$_5$, axiom)
$(\mathrm{r1exact}(x_1)$ and $\mathrm{s2exact}(x_1)) \Rightarrow (e(x_1)$ or $s(x_1, \mathrm{u0r_1}(x_1))$ or $r(x_1, \mathrm{u0r_1}(x_1)))$ cnf(clause$_6$, axiom)
$(\mathrm{r1exact}(x_1)$ and $\mathrm{s2exact}(x_1)$ and $r(x_1, \mathrm{u0r_1}(x_1))$ and $s(x_1, \mathrm{u0r_1}(x_1))) \Rightarrow e(x_1)$ cnf(clause$_7$, axiom)
$(\mathrm{r1exact}(x_1)$ and $r(x_1, x_3)) \Rightarrow x_3{=}\mathrm{u1r_2}(x_1)$ cnf(clause$_8$, axiom)
$\mathrm{r1exact}(x_1) \Rightarrow r(x_1, \mathrm{u1r_2}(x_1))$ cnf(clause$_9$, axiom)
$(r(x_1, x_2)$ and $\mathrm{u1r_1}(x_2, x_1){=}x_2) \Rightarrow \mathrm{r1exact}(x_1)$ cnf(clause$_{10}$, axiom)
$r(x_1, x_2) \Rightarrow (\mathrm{r1exact}(x_1)$ or $r(x_1, \mathrm{u1r_1}(x_2, x_1)))$ cnf(clause$_{11}$, axiom)
$(\mathrm{s2exact}(x_1)$ and $s(x_1, x_4)) \Rightarrow (x_4{=}\mathrm{u2r_3}(x_1)$ or $x_4{=}\mathrm{u2r_2}(x_1))$ cnf(clause$_{12}$, axiom)
$\mathrm{s2exact}(x_1) \Rightarrow \neg\, \mathrm{u2r_3}(x_1){=}\mathrm{u2r_2}(x_1)$ cnf(clause$_{13}$, axiom)
$\mathrm{s2exact}(x_1) \Rightarrow s(x_1, \mathrm{u2r_2}(x_1))$ cnf(clause$_{14}$, axiom)
$\mathrm{s2exact}(x_1) \Rightarrow s(x_1, \mathrm{u2r_3}(x_1))$ cnf(clause$_{15}$, axiom)
$(s(x_1, x_3)$ and $s(x_1, x_2)$ and $\mathrm{u2r_1}(x_3, x_2, x_1){=}x_2) \Rightarrow (\mathrm{s2exact}(x_1)$ or $x_3{=}x_2)$ cnf(clause$_{16}$, axiom)
$(s(x_1, x_3)$ and $s(x_1, x_2)$ and $\mathrm{u2r_1}(x_3, x_2, x_1){=}x_3) \Rightarrow (\mathrm{s2exact}(x_1)$ or $x_3{=}x_2)$ cnf(clause$_{17}$, axiom)
$(s(x_1, x_3)$ and $s(x_1, x_2)) \Rightarrow (\mathrm{s2exact}(x_1)$ or $x_3{=}x_2$ or $s(x_1, \mathrm{u2r_1}(x_3, x_2, x_1)))$ cnf(clause$_{18}$, axiom)

KRS015-1.p Paramasivam problem T-Box 5b

e exists.
$e(\text{exist})$ $\text{cnf}(\text{clause}_1, \text{negated\_conjecture})$
$c(x_1) \Rightarrow \text{t2least}(x_1)$ $\text{cnf}(\text{clause}_2, \text{axiom})$
$\text{t2least}(x_1) \Rightarrow c(x_1)$ $\text{cnf}(\text{clause}_3, \text{axiom})$
$\text{t2least}(x_1) \Rightarrow \neg\,\text{u1r}_2(x_1){=}\text{u1r}_1(x_1)$ $\text{cnf}(\text{clause}_4, \text{axiom})$
$\text{t2least}(x_1) \Rightarrow t(x_1, \text{u1r}_1(x_1))$ $\text{cnf}(\text{clause}_5, \text{axiom})$
$\text{t2least}(x_1) \Rightarrow t(x_1, \text{u1r}_2(x_1))$ $\text{cnf}(\text{clause}_6, \text{axiom})$
$(t(x_1, x_3) \text{ and } t(x_1, x_2)) \Rightarrow (\text{t2least}(x_1) \text{ or } x_3{=}x_2)$ $\text{cnf}(\text{clause}_7, \text{axiom})$
$d(x_1) \Rightarrow \text{t1most}(x_1)$ $\text{cnf}(\text{clause}_8, \text{axiom})$
$\text{t1most}(x_1) \Rightarrow d(x_1)$ $\text{cnf}(\text{clause}_9, \text{axiom})$
$(\text{t1most}(x_1) \text{ and } t(x_1, x_3) \text{ and } t(x_1, x_2)) \Rightarrow x_3{=}x_2$ $\text{cnf}(\text{clause}_{10}, \text{axiom})$
$\text{u3r}_2(x_1){=}\text{u3r}_1(x_1) \Rightarrow \text{t1most}(x_1)$ $\text{cnf}(\text{clause}_{11}, \text{axiom})$
$\text{t1most}(x_1) \text{ or } t(x_1, \text{u3r}_1(x_1))$ $\text{cnf}(\text{clause}_{12}, \text{axiom})$
$\text{t1most}(x_1) \text{ or } t(x_1, \text{u3r}_2(x_1))$ $\text{cnf}(\text{clause}_{13}, \text{axiom})$
$e(x_1) \Rightarrow r(x_1, \text{u4r}_4(x_1))$ $\text{cnf}(\text{clause}_{14}, \text{axiom})$
$(e(x_1) \text{ and } r(x_1, x_4)) \Rightarrow s(x_1, x_4)$ $\text{cnf}(\text{clause}_{15}, \text{axiom})$
$(e(x_1) \text{ and } s(x_1, x_4)) \Rightarrow r(x_1, x_4)$ $\text{cnf}(\text{clause}_{16}, \text{axiom})$
$(e(x_1) \text{ and } s(x_1, x_3)) \Rightarrow d(x_3)$ $\text{cnf}(\text{clause}_{17}, \text{axiom})$
$(e(x_1) \text{ and } r(x_1, x_2)) \Rightarrow c(x_2)$ $\text{cnf}(\text{clause}_{18}, \text{axiom})$
$(c(\text{u4r}_1(x_1)) \text{ and } d(\text{u4r}_2(x_1)) \text{ and } r(x_1, x_5)) \Rightarrow (e(x_1) \text{ or } s(x_1, \text{u4r}_3(x_1)) \text{ or } r(x_1, \text{u4r}_3(x_1)))$ $\text{cnf}(\text{clause}_{19}, \text{axiom})$
$(c(\text{u4r}_1(x_1)) \text{ and } d(\text{u4r}_2(x_1)) \text{ and } r(x_1, \text{u4r}_3(x_1)) \text{ and } s(x_1, \text{u4r}_3(x_1)) \text{ and } r(x_1, x_5)) \Rightarrow e(x_1)$ $\text{cnf}(\text{clause}_{20}, \text{axiom})$
$(c(\text{u4r}_1(x_1)) \text{ and } r(x_1, x_5)) \Rightarrow (e(x_1) \text{ or } s(x_1, \text{u4r}_2(x_1)) \text{ or } s(x_1, \text{u4r}_3(x_1)) \text{ or } r(x_1, \text{u4r}_3(x_1)))$ $\text{cnf}(\text{clause}_{21}, \text{axiom})$
$(c(\text{u4r}_1(x_1)) \text{ and } r(x_1, \text{u4r}_3(x_1)) \text{ and } s(x_1, \text{u4r}_3(x_1)) \text{ and } r(x_1, x_5)) \Rightarrow (e(x_1) \text{ or } s(x_1, \text{u4r}_2(x_1)))$ $\text{cnf}(\text{clause}_{22}, \text{axiom})$
$(d(\text{u4r}_2(x_1)) \text{ and } r(x_1, x_5)) \Rightarrow (e(x_1) \text{ or } r(x_1, \text{u4r}_1(x_1)) \text{ or } s(x_1, \text{u4r}_3(x_1)) \text{ or } r(x_1, \text{u4r}_3(x_1)))$ $\text{cnf}(\text{clause}_{23}, \text{axiom})$
$(d(\text{u4r}_2(x_1)) \text{ and } r(x_1, \text{u4r}_3(x_1)) \text{ and } s(x_1, \text{u4r}_3(x_1)) \text{ and } r(x_1, x_5)) \Rightarrow (e(x_1) \text{ or } r(x_1, \text{u4r}_1(x_1)))$ $\text{cnf}(\text{clause}_{24}, \text{axiom})$
$r(x_1, x_5) \Rightarrow (e(x_1) \text{ or } r(x_1, \text{u4r}_1(x_1)) \text{ or } s(x_1, \text{u4r}_2(x_1)) \text{ or } s(x_1, \text{u4r}_3(x_1)) \text{ or } r(x_1, \text{u4r}_3(x_1)))$ $\text{cnf}(\text{clause}_{25}, \text{axiom})$
$(r(x_1, \text{u4r}_3(x_1)) \text{ and } s(x_1, \text{u4r}_3(x_1)) \text{ and } r(x_1, x_5)) \Rightarrow (e(x_1) \text{ or } r(x_1, \text{u4r}_1(x_1)) \text{ or } s(x_1, \text{u4r}_2(x_1)))$ $\text{cnf}(\text{clause}_{26}, \text{axiom})$

KRS016-1.p Paramasivam problem T-Box 5c
c and d exist.
$c(\text{exist})$ $\text{cnf}(\text{clause}_1, \text{negated\_conjecture})$
$d(\text{exist})$ $\text{cnf}(\text{clause}_2, \text{negated\_conjecture})$
$(c(x_1) \text{ and } r(x_1, x_2)) \Rightarrow s(x_1, x_2)$ $\text{cnf}(\text{clause}_3, \text{axiom})$
$(c(x_1) \text{ and } s(x_1, x_2)) \Rightarrow r(x_1, x_2)$ $\text{cnf}(\text{clause}_4, \text{axiom})$
$c(x_1) \Rightarrow \text{r1most}(x_1)$ $\text{cnf}(\text{clause}_5, \text{axiom})$
$\text{r1most}(x_1) \Rightarrow (c(x_1) \text{ or } s(x_1, \text{u0r}_1(x_1)) \text{ or } r(x_1, \text{u0r}_1(x_1)))$ $\text{cnf}(\text{clause}_6, \text{axiom})$
$(\text{r1most}(x_1) \text{ and } r(x_1, \text{u0r}_1(x_1)) \text{ and } s(x_1, \text{u0r}_1(x_1))) \Rightarrow c(x_1)$ $\text{cnf}(\text{clause}_7, \text{axiom})$
$(\text{r1most}(x_1) \text{ and } r(x_1, x_3) \text{ and } r(x_1, x_2)) \Rightarrow x_3{=}x_2$ $\text{cnf}(\text{clause}_8, \text{axiom})$
$\text{u1r}_2(x_1){=}\text{u1r}_1(x_1) \Rightarrow \text{r1most}(x_1)$ $\text{cnf}(\text{clause}_9, \text{axiom})$
$\text{r1most}(x_1) \text{ or } r(x_1, \text{u1r}_1(x_1))$ $\text{cnf}(\text{clause}_{10}, \text{axiom})$
$\text{r1most}(x_1) \text{ or } r(x_1, \text{u1r}_2(x_1))$ $\text{cnf}(\text{clause}_{11}, \text{axiom})$
$(d(x_1) \text{ and } r(x_1, x_2)) \Rightarrow \neg\, s(x_1, x_2)$ $\text{cnf}(\text{clause}_{12}, \text{axiom})$
$d(x_1) \Rightarrow \text{s1most}(x_1)$ $\text{cnf}(\text{clause}_{13}, \text{axiom})$
$\text{s1most}(x_1) \Rightarrow (d(x_1) \text{ or } s(x_1, \text{u2r}_1(x_1)))$ $\text{cnf}(\text{clause}_{14}, \text{axiom})$
$\text{s1most}(x_1) \Rightarrow (d(x_1) \text{ or } r(x_1, \text{u2r}_1(x_1)))$ $\text{cnf}(\text{clause}_{15}, \text{axiom})$
$(\text{s1most}(x_1) \text{ and } s(x_1, x_3) \text{ and } s(x_1, x_2)) \Rightarrow x_3{=}x_2$ $\text{cnf}(\text{clause}_{16}, \text{axiom})$
$\text{u3r}_2(x_1){=}\text{u3r}_1(x_1) \Rightarrow \text{s1most}(x_1)$ $\text{cnf}(\text{clause}_{17}, \text{axiom})$
$\text{s1most}(x_1) \text{ or } s(x_1, \text{u3r}_1(x_1))$ $\text{cnf}(\text{clause}_{18}, \text{axiom})$
$\text{s1most}(x_1) \text{ or } s(x_1, \text{u3r}_2(x_1))$ $\text{cnf}(\text{clause}_{19}, \text{axiom})$

KRS017-1.p Paramasivam problem T-Box 7a
a subsumes e.
$e(\text{exists})$ $\text{cnf}(\text{clause}_1, \text{negated\_conjecture})$
$\neg\, a(\text{exists})$ $\text{cnf}(\text{clause}_2, \text{negated\_conjecture})$
$e(x_1) \Rightarrow r(x_1, \text{u0r}_3(x_1))$ $\text{cnf}(\text{clause}_3, \text{axiom})$
$(e(x_1) \text{ and } r(x_1, x_2) \text{ and } r(x_3, x_2)) \Rightarrow a(x_3)$ $\text{cnf}(\text{clause}_4, \text{axiom})$
$(a(\text{u0r}_2(x_1)) \text{ and } r(x_1, x_4)) \Rightarrow e(x_1)$ $\text{cnf}(\text{clause}_5, \text{axiom})$
$r(x_1, x_4) \Rightarrow (e(x_1) \text{ or } r(\text{u0r}_2(x_1), \text{u0r}_1(x_1)))$ $\text{cnf}(\text{clause}_6, \text{axiom})$
$r(x_1, x_4) \Rightarrow (e(x_1) \text{ or } r(x_1, \text{u0r}_1(x_1)))$ $\text{cnf}(\text{clause}_7, \text{axiom})$

KRS018+1.p Nothing can be defined using OWL Lite restrictions

$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cNothing(x) $\Rightarrow$ $\neg\exists y$: rp(x, y)) fof(axiom$_2$, axiom)
$\forall x$: (cNothing(x) $\Rightarrow$ $\exists y_0$: rp(x, y_0)) fof(axiom$_3$, axiom)

KRS019+1.p The complement of a class can be defined using OWL Lite
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cA(x) $\iff$ $\exists y$: (rq(x, y) and cowlThing(y))) fof(axiom$_2$, axiom)
$\forall x$: (cNothing(x) $\Rightarrow$ $\neg\exists y$: rp(x, y)) fof(axiom$_3$, axiom)
$\forall x$: (cNothing(x) $\Rightarrow$ $\exists y_0$: rp(x, y_0)) fof(axiom$_4$, axiom)
$\forall x$: (cnotA(x) $\iff$ $\forall y$: (rq(x, y) $\Rightarrow$ cNothing(y))) fof(axiom$_5$, axiom)

KRS020+1.p The union of two classes can be defined using OWL Lite
The union of two classes can be defined using OWL Lite restrictions, and owl:intersectionOf.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cA(x) $\iff$ $\exists y$: (rq(x, y) and cowlThing(y))) fof(axiom$_2$, axiom)
$\forall x$: (cAorB(x) $\iff$ $\exists y$: (rs(x, y) and cowlThing(y))) fof(axiom$_3$, axiom)
$\forall x$: (cB(x) $\iff$ $\exists y$: (rr(x, y) and cowlThing(y))) fof(axiom$_4$, axiom)
$\forall x$: (cNothing(x) $\Rightarrow$ $\neg\exists y$: rp(x, y)) fof(axiom$_5$, axiom)
$\forall x$: (cNothing(x) $\Rightarrow$ $\exists y_0$: rp(x, y_0)) fof(axiom$_6$, axiom)
$\forall x$: (cnotA(x) $\iff$ $\forall y$: (rq(x, y) $\Rightarrow$ cNothing(y))) fof(axiom$_7$, axiom)
$\forall x$: (cnotAorB(x) $\iff$ $\forall y$: (rs(x, y) $\Rightarrow$ cNothing(y))) fof(axiom$_8$, axiom)
$\forall x$: (cnotAorB(x) $\iff$ (cnotB(x) and cnotA(x))) fof(axiom$_9$, axiom)
$\forall x$: (cnotB(x) $\iff$ $\forall y$: (rr(x, y) $\Rightarrow$ cNothing(y))) fof(axiom$_{10}$, axiom)

KRS021+1.p Informal semantics for RDF container are not respected by OWL
The informal semantics for RDF container vocabulary, indicated by the comment, are not respected by the formal machinery of OWL.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
crdfBag(i2003_11_14_17_14$_{36685}$) fof(axiom$_2$, axiom)
rrdf$_1$(i2003_11_14_17_14$_{36685}$, i2003_11_14_17_14$_{36852}$) fof(axiom$_3$, axiom)
cowlThing(i2003_11_14_17_14$_{36852}$) fof(axiom$_4$, axiom)

KRS022+1.p Informal semantics for RDF container are not respected by OWL
The informal semantics indicated by comments concerning user defined classes are not respected by the formal machinery of OWL.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
cBag(i2003_11_14_17_14$_{39627}$) fof(axiom$_2$, axiom)
r_1(i2003_11_14_17_14$_{39627}$, i2003_11_14_17_14$_{39661}$) fof(axiom$_3$, axiom)
cowlThing(i2003_11_14_17_14$_{39661}$) fof(axiom$_4$, axiom)

KRS023+1.p A minimal OWL Lite version of I5.3-005
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
cowlThing(i2003_11_14_17_14$_{42352}$) fof(axiom$_2$, axiom)
cowlThing(i2003_11_14_17_14$_{42102}$) fof(axiom$_3$, axiom)
rp(i2003_11_14_17_14$_{42102}$, i2003_11_14_17_14$_{42352}$) fof(axiom$_4$, axiom)

KRS024+1.p An OWL Lite version of I5.3-007
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
cowlThing(i2003_11_14_17_14$_{46558}$) fof(axiom$_2$, axiom)
xsd_string(xsd_string$_0$) fof(axiom$_3$, axiom)
rdp(i2003_11_14_17_14$_{46558}$, xsd_string$_0$) fof(axiom$_4$, axiom)

KRS025+1.p Classes can be the object of annotation properties
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
cowlThing(i2003_11_14_17_14$_{4992}$) fof(axiom$_2$, axiom)

KRS026+1.p The extension of OWL Thing may be a singleton in OWL DL
$\forall a, b$: $((a = b$ and cowlNothing$(a)) \Rightarrow$ cowlNothing$(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlThing$(a)) \Rightarrow$ cowlThing$(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and xsd_integer$(a)) \Rightarrow$ xsd_integer$(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and xsd_string$(a)) \Rightarrow$ xsd_string$(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string$(x) \iff \neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cowlThing$(x) \iff x =$ is) fof(axiom$_2$, axiom)
cowlThing(is) fof(axiom$_3$, axiom)

KRS027+1.p An example of use
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string$(x) \iff \neg$ xsd_integer(x)) fof(axiom$_1$, axiom)

KRS029+1.p DL Test: t1.1
$\forall a, b$: $((a = b$ and cSatisfiable$(a)) \Rightarrow$ cSatisfiable$(b))$ fof(cSatisfiable_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlNothing$(a)) \Rightarrow$ cowlNothing$(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlThing$(a)) \Rightarrow$ cowlThing$(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$_1(a)) \Rightarrow$ cp$_1(b))$ fof(cp1_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$_2(a)) \Rightarrow$ cp$_2(b))$ fof(cp2_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$_3(a)) \Rightarrow$ cp$_3(b))$ fof(cp3_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$_4(a)) \Rightarrow$ cp$_4(b))$ fof(cp4_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$_5(a)) \Rightarrow$ cp$_5(b))$ fof(cp5_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rinvR$(a, c)) \Rightarrow$ rinvR$(b, c))$ fof(rinvR_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rinvR$(c, a)) \Rightarrow$ rinvR$(c, b))$ fof(rinvR_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and rr$(a, c)) \Rightarrow$ rr$(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rr$(c, a)) \Rightarrow$ rr$(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b$: $((a = b$ and xsd_integer$(a)) \Rightarrow$ xsd_integer$(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and xsd_string$(a)) \Rightarrow$ xsd_string$(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string$(x) \iff \neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cSatisfiable$(x) \iff \exists y$: (rinvR(x, y) and $\exists z$: (rr(y, z) and cp$_1(z)$) and $\forall z_0, z_1$: ((rr(y, z_0) and rr(y, z_1)) $\Rightarrow$ $z_0 = z_1$))) fof(axiom$_2$, axiom)
$\forall x$: (cp$_1(x) \Rightarrow \neg$ cp$_2(x)$ or cp$_5(x)$ or cp$_4(x)$ or cp$_3(x)$) fof(axiom$_3$, axiom)
$\forall x$: (cp$_2(x) \Rightarrow \neg$ cp$_5(x)$ or cp$_4(x)$ or cp$_3(x)$) fof(axiom$_4$, axiom)
$\forall x$: (cp$_3(x) \Rightarrow \neg$ cp$_5(x)$ or cp$_4(x)$) fof(axiom$_5$, axiom)
$\forall x$: (cp$_4(x) \Rightarrow \neg$ cp$_5(x)$) fof(axiom$_6$, axiom)
$\forall x, y$: (rinvR$(x, y) \iff$ rr(y, x)) fof(axiom$_7$, axiom)
cSatisfiable(i2003_11_14_17_15$_{22537}$) fof(axiom$_8$, axiom)

KRS031+1.p DL Test: t2.1
$\forall a, b$: $((a = b$ and cSatisfiable$(a)) \Rightarrow$ cSatisfiable$(b))$ fof(cSatisfiable_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlNothing$(a)) \Rightarrow$ cowlNothing$(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlThing$(a)) \Rightarrow$ cowlThing$(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$_1(a)) \Rightarrow$ cp$_1(b))$ fof(cp1_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$_2(a)) \Rightarrow$ cp$_2(b))$ fof(cp2_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rf$_1(a, c)) \Rightarrow$ rf$_1(b, c))$ fof(rf1_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rf$_1(c, a)) \Rightarrow$ rf$_1(c, b))$ fof(rf1_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and rf$_2(a, c)) \Rightarrow$ rf$_2(b, c))$ fof(rf2_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rf$_2(c, a)) \Rightarrow$ rf$_2(c, b))$ fof(rf2_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and rr$(a, c)) \Rightarrow$ rr$(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rr$(c, a)) \Rightarrow$ rr$(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b$: $((a = b$ and xsd_integer$(a)) \Rightarrow$ xsd_integer$(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and xsd_string$(a)) \Rightarrow$ xsd_string$(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string$(x) \iff \neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cSatisfiable$(x) \iff (\exists y$: (rf$_1(x, y)$ and cp$_1(y)$) and $\exists y$: (rf$_2(x, y)$ and cp$_2(y)$))) fof(axiom$_2$, axiom)
$\forall x$: (cp$_1(x) \Rightarrow \neg$ cp$_2(x)$) fof(axiom$_3$, axiom)
$\forall x$: (cowlThing$(x) \Rightarrow \forall y_0, y_1$: ((rf$_2(x, y_0)$ and rf$_2(x, y_1)$) $\Rightarrow y_0 = y_1$)) fof(axiom$_4$, axiom)
$\forall x$: (cowlThing$(x) \Rightarrow \forall y_0, y_1$: ((rf$_1(x, y_0)$ and rf$_1(x, y_1)$) $\Rightarrow y_0 = y_1$)) fof(axiom$_5$, axiom)
cSatisfiable(i2003_11_14_17_15$_{2938}$) fof(axiom$_6$, axiom)

$\forall x, y\colon (\mathrm{rr}(x, y) \Rightarrow \mathrm{rf}_1(x, y))$ fof(axiom$_7$, axiom)
$\forall x, y\colon (\mathrm{rr}(x, y) \Rightarrow \mathrm{rf}_2(x, y))$ fof(axiom$_8$, axiom)

KRS032+1.p DL Test: t3.1
$\forall a, b\colon ((a = b \text{ and } \mathrm{cSatisfiable}(a)) \Rightarrow \mathrm{cSatisfiable}(b))$ fof(cSatisfiable_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlNothing}(a)) \Rightarrow \mathrm{cowlNothing}(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlThing}(a)) \Rightarrow \mathrm{cowlThing}(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cp}(a)) \Rightarrow \mathrm{cp}(b))$ fof(cp_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cp}_1(a)) \Rightarrow \mathrm{cp}_1(b))$ fof(cp1_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cp}_2(a)) \Rightarrow \mathrm{cp}_2(b))$ fof(cp2_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cp}_3(a)) \Rightarrow \mathrm{cp}_3(b))$ fof(cp3_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cp}_4(a)) \Rightarrow \mathrm{cp}_4(b))$ fof(cp4_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cp}_5(a)) \Rightarrow \mathrm{cp}_5(b))$ fof(cp5_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(a, c)) \Rightarrow \mathrm{rr}(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(c, a)) \Rightarrow \mathrm{rr}(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_integer}(a)) \Rightarrow \mathrm{xsd\_integer}(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_string}(a)) \Rightarrow \mathrm{xsd\_string}(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg \mathrm{cowlNothing}(x))$ fof(axiom$_0$, axiom)
$\forall x\colon (\mathrm{xsd\_string}(x) \iff \neg \mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x\colon (\mathrm{cSatisfiable}(x) \iff (\exists y\colon (\mathrm{rr}(x, y) \text{ and } \mathrm{cp}_3(y)) \text{ and } \forall y_0, y_1, y_2, y_3\colon ((\mathrm{rr}(x, y_0) \text{ and } \mathrm{rr}(x, y_1) \text{ and } \mathrm{rr}(x, y_2) \text{ and } \mathrm{rr}(x, y_3)) \Rightarrow$
$(y_0 = y_1 \text{ or } y_0 = y_2 \text{ or } y_0 = y_3 \text{ or } y_1 = y_2 \text{ or } y_1 = y_3 \text{ or } y_2 = y_3)) \text{ and } \exists y\colon (\mathrm{rr}(x, y) \text{ and } \mathrm{cp}_3(y) \text{ and } \mathrm{cp}(y)) \text{ and } \exists y\colon (\mathrm{rr}(x, y) \text{ an}$
$\forall x\colon (\mathrm{cp}_1(x) \Rightarrow \neg \mathrm{cp}_4(x) \text{ or } \mathrm{cp}_3(x) \text{ or } \mathrm{cp}_5(x) \text{ or } \mathrm{cp}_2(x))$ fof(axiom$_3$, axiom)
$\forall x\colon (\mathrm{cp}_2(x) \Rightarrow \neg \mathrm{cp}_4(x) \text{ or } \mathrm{cp}_3(x) \text{ or } \mathrm{cp}_5(x))$ fof(axiom$_4$, axiom)
$\forall x\colon (\mathrm{cp}_3(x) \Rightarrow \neg \mathrm{cp}_4(x) \text{ or } \mathrm{cp}_5(x))$ fof(axiom$_5$, axiom)
$\forall x\colon (\mathrm{cp}_4(x) \Rightarrow \neg \mathrm{cp}_5(x))$ fof(axiom$_6$, axiom)
cSatisfiable(i2003_11_14_17_15$_{33836}$) fof(axiom$_7$, axiom)

KRS035+1.p DL Test: t5.1 Non-finite model example from paper
$\forall a, b\colon ((a = b \text{ and } \mathrm{cSatisfiable}(a)) \Rightarrow \mathrm{cSatisfiable}(b))$ fof(cSatisfiable_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{ca}(a)) \Rightarrow \mathrm{ca}(b))$ fof(ca_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlNothing}(a)) \Rightarrow \mathrm{cowlNothing}(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlThing}(a)) \Rightarrow \mathrm{cowlThing}(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rf}(a, c)) \Rightarrow \mathrm{rf}(b, c))$ fof(rf_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rf}(c, a)) \Rightarrow \mathrm{rf}(c, b))$ fof(rf_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvF}(a, c)) \Rightarrow \mathrm{rinvF}(b, c))$ fof(rinvF_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvF}(c, a)) \Rightarrow \mathrm{rinvF}(c, b))$ fof(rinvF_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvR}(a, c)) \Rightarrow \mathrm{rinvR}(b, c))$ fof(rinvR_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvR}(c, a)) \Rightarrow \mathrm{rinvR}(c, b))$ fof(rinvR_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(a, c)) \Rightarrow \mathrm{rr}(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(c, a)) \Rightarrow \mathrm{rr}(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_integer}(a)) \Rightarrow \mathrm{xsd\_integer}(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_string}(a)) \Rightarrow \mathrm{xsd\_string}(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg \mathrm{cowlNothing}(x))$ fof(axiom$_0$, axiom)
$\forall x\colon (\mathrm{xsd\_string}(x) \iff \neg \mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x\colon (\mathrm{cSatisfiable}(x) \iff (\neg \mathrm{ca}(x) \text{ and } \exists y\colon (\mathrm{rinvR}(x, y) \text{ and } \exists z\colon (\mathrm{rinvF}(y, z) \text{ and } \mathrm{ca}(z))) \text{ and } \exists y\colon (\mathrm{rinvF}(x, y) \text{ and } \mathrm{ca}(y))))$
$\forall x\colon (\mathrm{cowlThing}(x) \Rightarrow \forall y_0, y_1\colon ((\mathrm{rf}(x, y_0) \text{ and } \mathrm{rf}(x, y_1)) \Rightarrow y_0 = y_1))$ fof(axiom$_3$, axiom)
$\forall x, y\colon (\mathrm{rinvF}(x, y) \iff \mathrm{rf}(y, x))$ fof(axiom$_4$, axiom)
$\forall x, y\colon (\mathrm{rinvR}(x, y) \iff \mathrm{rr}(y, x))$ fof(axiom$_5$, axiom)
$\forall x, y, z\colon ((\mathrm{rr}(x, y) \text{ and } \mathrm{rr}(y, z)) \Rightarrow \mathrm{rr}(x, z))$ fof(axiom$_6$, axiom)
cSatisfiable(i2003_11_14_17_15$_{44810}$) fof(axiom$_7$, axiom)
$\forall x, y\colon (\mathrm{rf}(x, y) \Rightarrow \mathrm{rr}(x, y))$ fof(axiom$_8$, axiom)

KRS036+1.p DL Test: t5f.1 Non-finite model example from paper
$\forall a, b\colon ((a = b \text{ and } \mathrm{cSatisfiable}(a)) \Rightarrow \mathrm{cSatisfiable}(b))$ fof(cSatisfiable_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{ca}(a)) \Rightarrow \mathrm{ca}(b))$ fof(ca_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlNothing}(a)) \Rightarrow \mathrm{cowlNothing}(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlThing}(a)) \Rightarrow \mathrm{cowlThing}(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rf}(a, c)) \Rightarrow \mathrm{rf}(b, c))$ fof(rf_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rf}(c, a)) \Rightarrow \mathrm{rf}(c, b))$ fof(rf_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvF}(a, c)) \Rightarrow \mathrm{rinvF}(b, c))$ fof(rinvF_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvF}(c, a)) \Rightarrow \mathrm{rinvF}(c, b))$ fof(rinvF_substitution$_2$, axiom)

$\forall a, b, c$: $((a = b$ and $\text{rinvR}(a, c)) \Rightarrow \text{rinvR}(b, c))$ fof(rinvR_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rinvR}(c, a)) \Rightarrow \text{rinvR}(c, b))$ fof(rinvR_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rr}(a, c)) \Rightarrow \text{rr}(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rr}(c, a)) \Rightarrow \text{rr}(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b$: $((a = b$ and xsd_integer$(a)) \Rightarrow$ xsd_integer$(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and xsd_string$(a)) \Rightarrow$ xsd_string$(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string$(x) \iff \neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cSatisfiable$(x) \iff (\neg \text{ca}(x)$ and $\exists y$: (rinvR(x, y) and $\exists z$: (rinvF(y, z) and ca(z))) and $\exists y$: (rinvF(x, y) and ca(y))))
$\forall x, y, z$: $((\text{rf}(x, y)$ and $\text{rf}(x, z)) \Rightarrow y = z)$ fof(axiom$_3$, axiom)
$\forall x, y$: $(\text{rinvF}(x, y) \iff \text{rf}(y, x))$ fof(axiom$_4$, axiom)
$\forall x, y$: $(\text{rinvR}(x, y) \iff \text{rr}(y, x))$ fof(axiom$_5$, axiom)
$\forall x, y, z$: $((\text{rr}(x, y)$ and $\text{rr}(y, z)) \Rightarrow \text{rr}(x, z))$ fof(axiom$_6$, axiom)
cSatisfiable(i2003_11_14_17_15$_{47436}$) fof(axiom$_7$, axiom)
$\forall x, y$: $(\text{rf}(x, y) \Rightarrow \text{rr}(x, y))$ fof(axiom$_8$, axiom)

KRS037+1.p DL Test: t7.1
$\forall a, b$: $((a = b$ and cSatisfiable$(a)) \Rightarrow$ cSatisfiable$(b))$ fof(cSatisfiable_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlNothing$(a)) \Rightarrow$ cowlNothing$(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlThing$(a)) \Rightarrow$ cowlThing$(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\text{cp}_1(a)) \Rightarrow \text{cp}_1(b))$ fof(cp1_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rf}(a, c)) \Rightarrow \text{rf}(b, c))$ fof(rf_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rf}(c, a)) \Rightarrow \text{rf}(c, b))$ fof(rf_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rinvF}(a, c)) \Rightarrow \text{rinvF}(b, c))$ fof(rinvF_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rinvF}(c, a)) \Rightarrow \text{rinvF}(c, b))$ fof(rinvF_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rinvR}(a, c)) \Rightarrow \text{rinvR}(b, c))$ fof(rinvR_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rinvR}(c, a)) \Rightarrow \text{rinvR}(c, b))$ fof(rinvR_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rr}(a, c)) \Rightarrow \text{rr}(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rr}(c, a)) \Rightarrow \text{rr}(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b$: $((a = b$ and xsd_integer$(a)) \Rightarrow$ xsd_integer$(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and xsd_string$(a)) \Rightarrow$ xsd_string$(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string$(x) \iff \neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cSatisfiable$(x) \iff (\exists y$: (rr(x, y) and $\exists z$: (rr(y, z) and $\forall w$: (rinvR$(z, w) \Rightarrow (\neg \text{cp}_1(w)$ or $\forall a$: (rr$(w, a) \Rightarrow$ $\text{cp}_1(a)$)))) and $\text{cp}_1(z)$))) and $\text{cp}_1(x)$))) fof(axiom$_2$, axiom)
$\forall x$: (cowlThing$(x) \Rightarrow \forall y_0, y_1$: $((\text{rf}(x, y_0)$ and $\text{rf}(x, y_1)) \Rightarrow y_0 = y_1))$ fof(axiom$_3$, axiom)
$\forall x, y$: $(\text{rinvF}(x, y) \iff \text{rf}(y, x))$ fof(axiom$_4$, axiom)
$\forall x, y$: $(\text{rinvR}(x, y) \iff \text{rr}(y, x))$ fof(axiom$_5$, axiom)
$\forall x, y, z$: $((\text{rr}(x, y)$ and $\text{rr}(y, z)) \Rightarrow \text{rr}(x, z))$ fof(axiom$_6$, axiom)
cSatisfiable(i2003_11_14_17_15$_{51999}$) fof(axiom$_7$, axiom)

KRS038+1.p DL Test: t7f.1
$\forall a, b$: $((a = b$ and cSatisfiable$(a)) \Rightarrow$ cSatisfiable$(b))$ fof(cSatisfiable_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlNothing$(a)) \Rightarrow$ cowlNothing$(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlThing$(a)) \Rightarrow$ cowlThing$(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\text{cp}_1(a)) \Rightarrow \text{cp}_1(b))$ fof(cp1_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rf}(a, c)) \Rightarrow \text{rf}(b, c))$ fof(rf_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rf}(c, a)) \Rightarrow \text{rf}(c, b))$ fof(rf_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rinvF}(a, c)) \Rightarrow \text{rinvF}(b, c))$ fof(rinvF_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rinvF}(c, a)) \Rightarrow \text{rinvF}(c, b))$ fof(rinvF_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rinvR}(a, c)) \Rightarrow \text{rinvR}(b, c))$ fof(rinvR_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rinvR}(c, a)) \Rightarrow \text{rinvR}(c, b))$ fof(rinvR_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rr}(a, c)) \Rightarrow \text{rr}(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\text{rr}(c, a)) \Rightarrow \text{rr}(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b$: $((a = b$ and xsd_integer$(a)) \Rightarrow$ xsd_integer$(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and xsd_string$(a)) \Rightarrow$ xsd_string$(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string$(x) \iff \neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cSatisfiable$(x) \iff (\text{cp}_1(x)$ and $\exists y$: (rr(x, y) and $\exists z$: (rr(y, z) and $\text{cp}_1(z)$ and $\forall w$: (rinvR$(z, w) \Rightarrow (\forall a$: (rr$(w, a) \Rightarrow$ $\text{cp}_1(a)$) or $\neg \text{cp}_1(w)$)))))) fof(axiom$_2$, axiom)

$\forall x, y, z$: ((rf(x, y) and rf(x, z)) $\Rightarrow$ $y = z$) fof(axiom$_3$, axiom)
$\forall x, y$: (rinvF(x, y) $\iff$ rf(y, x)) fof(axiom$_4$, axiom)
$\forall x, y$: (rinvR(x, y) $\iff$ rr(y, x)) fof(axiom$_5$, axiom)
$\forall x, y, z$: ((rr(x, y) and rr(y, z)) $\Rightarrow$ rr(x, z)) fof(axiom$_6$, axiom)
cSatisfiable(i2003_11_14_17_15$_{54995}$) fof(axiom$_7$, axiom)

KRS039+1.p DL Test: t8.1
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cSatisfiable(x) $\iff$ ($\exists y$: (rr(x, y) and $\forall z$: (rinvR(y, z) $\Rightarrow$ $\forall w$: (rr$_1$(z, w) $\Rightarrow$ cp(w)))) and $\exists y$: (rr(x, y) and $\forall z$: (rinvR(
$\forall w$: (rr$_1$(z, w) $\Rightarrow$ $\neg$ cp(w)))))) fof(axiom$_2$, axiom)
$\forall x, y$: (rinvR(x, y) $\iff$ rr(y, x)) fof(axiom$_3$, axiom)
cSatisfiable(i2003_11_14_17_15$_{58383}$) fof(axiom$_4$, axiom)

KRS045+1.p DL Test: t2.1
$\forall a, b$: (($a = b$ and cSatisfiable(a)) $\Rightarrow$ cSatisfiable(b)) fof(cSatisfiable_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cp$_1$(a)) $\Rightarrow$ cp$_1$(b)) fof(cp1_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cp$_2$(a)) $\Rightarrow$ cp$_2$(b)) fof(cp2_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cp2xcomp(a)) $\Rightarrow$ cp2xcomp(b)) fof(cp2xcomp_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and ra_Px$_1$(a, c)) $\Rightarrow$ ra_Px$_1$(b, c)) fof(ra_Px1_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and ra_Px$_1$(c, a)) $\Rightarrow$ ra_Px$_1$(c, b)) fof(ra_Px1_substitution$_2$, axiom)
$\forall a, b, c$: (($a = b$ and rf$_1$(a, c)) $\Rightarrow$ rf$_1$(b, c)) fof(rf1_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rf$_1$(c, a)) $\Rightarrow$ rf$_1$(c, b)) fof(rf1_substitution$_2$, axiom)
$\forall a, b, c$: (($a = b$ and rf$_2$(a, c)) $\Rightarrow$ rf$_2$(b, c)) fof(rf2_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rf$_2$(c, a)) $\Rightarrow$ rf$_2$(c, b)) fof(rf2_substitution$_2$, axiom)
$\forall a, b, c$: (($a = b$ and rr(a, c)) $\Rightarrow$ rr(b, c)) fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rr(c, a)) $\Rightarrow$ rr(c, b)) fof(rr_substitution$_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cSatisfiable(x) $\iff$ ($\exists y$: (rf$_2$(x, y) and cp$_2$(y)) and $\exists y$: (rf$_1$(x, y) and cp$_1$(y)))) fof(axiom$_2$, axiom)
$\forall x$: (cp$_1$(x) $\Rightarrow$ cp2xcomp(x)) fof(axiom$_3$, axiom)
$\forall x$: (cp$_2$(x) $\iff$ $\neg$ $\exists y$: ra_Px$_1$(x, y)) fof(axiom$_4$, axiom)
$\forall x$: (cp2xcomp(x) $\iff$ $\exists y_0$: ra_Px$_1$(x, y_0)) fof(axiom$_5$, axiom)
$\forall x$: (cowlThing(x) $\Rightarrow$ $\forall y_0, y_1$: ((rf$_1$(x, y_0) and rf$_1$(x, y_1)) $\Rightarrow$ $y_0 = y_1$)) fof(axiom$_6$, axiom)
$\forall x$: (cowlThing(x) $\Rightarrow$ $\forall y_0, y_1$: ((rf$_2$(x, y_0) and rf$_2$(x, y_1)) $\Rightarrow$ $y_0 = y_1$)) fof(axiom$_7$, axiom)
cSatisfiable(i2003_11_14_17_16$_{21280}$) fof(axiom$_8$, axiom)
$\forall x, y$: (rr(x, y) $\Rightarrow$ rf$_1$(x, y)) fof(axiom$_9$, axiom)
$\forall x, y$: (rr(x, y) $\Rightarrow$ rf$_2$(x, y)) fof(axiom$_{10}$, axiom)

KRS050+1.p DL Test: t8.1
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cSatisfiable(x) $\iff$ ($\exists y$: (rr(x, y) and ca_Vx$_4$(y)) and $\exists y$: (rr(x, y) and ca_Vx$_5$(y)))) fof(axiom$_2$, axiom)
$\forall x$: (cp(x) $\iff$ $\neg$ $\exists y$: ra_Px$_1$(x, y)) fof(axiom$_3$, axiom)
$\forall x$: (cpxcomp(x) $\iff$ $\exists y_0$: ra_Px$_1$(x, y_0)) fof(axiom$_4$, axiom)
$\forall x$: (ca_Vx$_2$(x) $\iff$ $\forall y$: (rr$_1$(x, y) $\Rightarrow$ cp(y))) fof(axiom$_5$, axiom)
$\forall x$: (ca_Vx$_3$(x) $\iff$ $\forall y$: (rr$_1$(x, y) $\Rightarrow$ cpxcomp(y))) fof(axiom$_6$, axiom)
$\forall x$: (ca_Vx$_4$(x) $\iff$ $\forall y$: (rinvR(x, y) $\Rightarrow$ ca_Vx$_2$(y))) fof(axiom$_7$, axiom)
$\forall x$: (ca_Vx$_5$(x) $\iff$ $\forall y$: (rinvR(x, y) $\Rightarrow$ ca_Vx$_3$(y))) fof(axiom$_8$, axiom)
$\forall x, y$: (rinvR(x, y) $\iff$ rr(y, x)) fof(axiom$_9$, axiom)
cSatisfiable(i2003_11_14_17_16$_{39209}$) fof(axiom$_{10}$, axiom)

KRS053+1.p owl:disjointWith edges may be within OWL DL
If the owl:disjointWith edges in the graph form an undirected complete subgraph then this may be within OWL DL.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: ($\neg$ cD(x) and cC(x) and $\neg$ cD(x) and cE(x) and $\neg$ cD(x) and cA(x) and $\neg$ cD(x) and cB(x) and $\neg$ cC(x) and cE(x) and

KRS054+1.p owl:disjointWith edges may be within OWL DL
If the owl:disjointWith edges in the graph form unconnected undirected complete subgraphs then this may be within OWL DL.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: ($\neg$ cE(x) and cD(x) and $\neg$ cE(x) and cA(x) and $\neg$ cD(x) and cA(x)) fof(axiom$_2$, axiom)
$\forall x$: $\neg$ cB(x) and cC(x) fof(axiom$_3$, axiom)

KRS055+1.p owl:disjointWith edges may be within OWL DL
If the owl:disjointWith edges in the graph form undirected complete subgraphs which share URIref nodes but do not share blank node then this may be within OWL DL.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: ($\neg$ cE(x) and cA(x) and $\neg$ cE(x) and cD(x) and $\neg$ cA(x) and cD(x)) fof(axiom$_2$, axiom)
$\forall x$: ($\neg$ cB(x) and cA(x) and $\neg$ cB(x) and cC(x) and $\neg$ cA(x) and cC(x)) fof(axiom$_3$, axiom)

KRS056+1.p owl:disjointWith edges may be within OWL DL
If the owl:disjointWith edges in the graph form undirected complete subgraphs which share URIref nodes but do not share blank node then this may be within OWL DL.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: ($\neg$ cC(x) and cD(x) and $\neg$ cC(x) and cA(x) and $\neg$ cD(x) and cA(x)) fof(axiom$_2$, axiom)
$\forall x$: ($\neg$ cD(x) and cB(x) and $\neg$ cD(x) and cA(x) and $\neg$ cB(x) and cA(x)) fof(axiom$_3$, axiom)

KRS057+1.p A possible mapping of the EquivalentClasses axiom
A possible mapping of the EquivalentClasses axiom, which is connected but without a Hamiltonian path.
$\forall a, b$: (($a = b$ and cB(a)) $\Rightarrow$ cB(b)) fof(cB_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cC(a)) $\Rightarrow$ cC(b)) fof(cC_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cD(a)) $\Rightarrow$ cD(b)) fof(cD_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
cowlThing(iA) fof(axiom$_2$, axiom)
$\forall x$: ((cB(x) $\iff$ cC(x)) and (cB(x) $\iff$ x = iA) and (cB(x) $\iff$ $\neg$ cD(x)) and (cC(x) $\iff$ x = iA) and (cC(x) $\iff$ $\neg$ cD(x)) and (x = iA $\iff$ $\neg$ cD(x))) fof(axiom$_3$, axiom)

KRS058+1.p A simple test for infinite loops in imports processing code
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)

KRS059+1.p Abstract syntax restrictions with multiple components
Abstract syntax restrictions with multiple components are in OWL DL.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\exists x$: (rp(ii, x) and cs(x)) fof(axiom_2_AndLHS, axiom)
$\forall x$: (rp(ii, x) $\Rightarrow$ ca(x)) fof(axiom_2_AndRHS, axiom)
cowlThing(ii) fof(axiom$_3$, axiom)

KRS060+1.p Description cannot be expressed as a multicomponent restriction
This description cannot be expressed as a multicomponent restriction in the abstract syntax.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (rp(ii, x) $\Rightarrow$ ca(x)) fof(axiom_2_AndLHS, axiom)
$\exists x$: (rq(ii, x) and cs(x)) fof(axiom_2_AndRHS, axiom)
cowlThing(ii) fof(axiom$_3$, axiom)

KRS061+1.p User labels in a variety of languages with ruby annotation
This test shows how user labels in a variety of languages can be used. Note the use of ruby annotation.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)

$\text{cShakespearePlay}(\text{iRomeo\_and\_Juliet})$ fof(axiom$_2$, axiom)

KRS062+1.p dc:creator may be declared as an annotation property
$\forall x$: (cowlThing(x) and ¬ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ ¬ xsd_integer(x)) fof(axiom$_1$, axiom)

KRS063+1.p An example combining owl:oneOf and owl:inverseOf
$\forall a, b$: (($a = b$ and cEUCountry(a)) $\Rightarrow$ cEUCountry(b)) fof(cEUCountry_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cEuroMP(a)) $\Rightarrow$ cEuroMP(b)) fof(cEuroMP_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cEuropeanCountry(a)) $\Rightarrow$ cEuropeanCountry(b)) fof(cEuropeanCountry_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cPerson(a)) $\Rightarrow$ cPerson(b)) fof(cPerson_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rhasEuroMP(a, c)) $\Rightarrow$ rhasEuroMP(b, c)) fof(rhasEuroMP_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rhasEuroMP(c, a)) $\Rightarrow$ rhasEuroMP(c, b)) fof(rhasEuroMP_substitution$_2$, axiom)
$\forall a, b, c$: (($a = b$ and risEuroMPFrom(a, c)) $\Rightarrow$ risEuroMPFrom(b, c)) fof(risEuroMPFrom_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and risEuroMPFrom(c, a)) $\Rightarrow$ risEuroMPFrom(c, b)) fof(risEuroMPFrom_substitution$_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and ¬ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ ¬ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cEUCountry(x) $\iff$ (x = iPT or x = iBE or x = iNL or x = iES or x = iFR or x = iUK)) fof(axiom$_2$, axiom)
$\forall x$: (cEuroMP(x) $\iff$ $\exists y$: (risEuroMPFrom(x, y) and cowlThing(y))) fof(axiom$_3$, axiom)
$\forall x, y$: (rhasEuroMP(x, y) $\Rightarrow$ cEUCountry(x)) fof(axiom$_4$, axiom)
$\forall x, y$: (risEuroMPFrom(x, y) $\iff$ rhasEuroMP(y, x)) fof(axiom$_5$, axiom)
cEuropeanCountry(iBE) fof(axiom$_6$, axiom)
cEuropeanCountry(iES) fof(axiom$_7$, axiom)
cEuropeanCountry(iFR) fof(axiom$_8$, axiom)
cPerson(iKinnock) fof(axiom$_9$, axiom)
¬ cEuroMP(iKinnock) fof(axiom$_{10}$, axiom)
cEuropeanCountry(iNL) fof(axiom$_{11}$, axiom)
cEuropeanCountry(iPT) fof(axiom$_{12}$, axiom)
cEuropeanCountry(iUK) fof(axiom$_{13}$, axiom)
rhasEuroMP(iUK, iKinnock) fof(axiom$_{14}$, axiom)

KRS064+1.p Something of type owl:Nothing
The triple asserts something of type owl:Nothing, however that is the empty class.
$\forall x$: (cowlThing(x) and ¬ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ ¬ xsd_integer(x)) fof(axiom$_1$, axiom)
cowlNothing(i2003_11_14_17_18$_{08754}$) fof(axiom$_2$, axiom)

KRS065+1.p The syntax for using the same restriction twice in OWL Lite
This test shows the syntax for using the same restriction twice in OWL Lite.
$\forall x$: (cowlThing(x) and ¬ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ ¬ xsd_integer(x)) fof(axiom$_1$, axiom)
$\exists x$: (rop(ia, x) and cowlNothing(x)) fof(axiom$_2$, axiom)
$\exists x$: (rop(ib, x) and cowlNothing(x)) fof(axiom$_3$, axiom)

KRS066+1.p The extension of OWL Thing may not be emtpy in OWL Lite
$\forall x$: (cowlThing(x) and ¬ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ ¬ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cowlThing(x) $\iff$ cowlNothing(x)) fof(axiom$_2$, axiom)

KRS067+1.p DL Test: fact1.1
If a, b and c are disjoint, then: (a and b) or (b and c) or (c and a) is unsatisfiable.
$\forall x$: (cowlThing(x) and ¬ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ ¬ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ ((cc(x) and cb(x)) or (cb(x) and ca(x)) or (cc(x) and ca(x)))) fof(axiom$_2$, axiom)
$\forall x$: (ca(x) $\Rightarrow$ ¬ cc(x) or cb(x)) fof(axiom$_3$, axiom)
$\forall x$: (cb(x) $\Rightarrow$ ¬ cc(x)) fof(axiom$_4$, axiom)
cUnsatisfiable(i2003_11_14_17_18$_{1956}$) fof(axiom$_5$, axiom)

KRS068+1.p DL Test: fact2.1

$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom_0, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom_1, axiom)
$\forall x$: (cUnsatisfiable(x) $\Rightarrow$ cc(x)) fof(axiom_2, axiom)
$\forall x$: (cUnsatisfiable(x) $\Rightarrow$ $\neg$ cd(x)) fof(axiom_3, axiom)
$\forall x$: (cc(x) $\Rightarrow$ $\forall y$: (rr(x, y) $\Rightarrow$ cc(y))) fof(axiom_4, axiom)
cUnsatisfiable(i2003_11_14_17_18_{23845}) fof(axiom_5, axiom)
$\forall x$: ($\forall y$: (rr(x, y) $\Rightarrow$ cc(y)) $\Rightarrow$ cd(x)) fof(axiom_6, axiom)

KRS069+1.p DL Test: fact3.1
$\forall a, b$: (($a = b$ and cUnsatisfiable(a)) $\Rightarrow$ cUnsatisfiable(b)) fof(cUnsatisfiable_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cp_1(a)) $\Rightarrow$ cp_1(b)) fof(cp1_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cp_2(a)) $\Rightarrow$ cp_2(b)) fof(cp2_substitution_1, axiom)
$\forall a, b, c$: (($a = b$ and rf_1(a, c)) $\Rightarrow$ rf_1(b, c)) fof(rf1_substitution_1, axiom)
$\forall a, b, c$: (($a = b$ and rf_1(c, a)) $\Rightarrow$ rf_1(c, b)) fof(rf1_substitution_2, axiom)
$\forall a, b, c$: (($a = b$ and rf_2(a, c)) $\Rightarrow$ rf_2(b, c)) fof(rf2_substitution_1, axiom)
$\forall a, b, c$: (($a = b$ and rf_2(c, a)) $\Rightarrow$ rf_2(c, b)) fof(rf2_substitution_2, axiom)
$\forall a, b, c$: (($a = b$ and rf_3(a, c)) $\Rightarrow$ rf_3(b, c)) fof(rf3_substitution_1, axiom)
$\forall a, b, c$: (($a = b$ and rf_3(c, a)) $\Rightarrow$ rf_3(c, b)) fof(rf3_substitution_2, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution_1, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution_1, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom_0, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom_1, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ ($\exists y$: (rf_1(x, y) and cp_1(y)) and $\exists y$: (rf_2(x, y) and $\neg$ cp_1(y)) and $\exists y$: (rf_3(x, y) and cp_2(y)))) fo
$\forall x, y, z$: ((rf_1(x, y) and rf_1(x, z)) $\Rightarrow$ $y = z$) fof(axiom_3, axiom)
$\forall x, y, z$: ((rf_2(x, y) and rf_2(x, z)) $\Rightarrow$ $y = z$) fof(axiom_4, axiom)
$\forall x, y, z$: ((rf_3(x, y) and rf_3(x, z)) $\Rightarrow$ $y = z$) fof(axiom_5, axiom)
cUnsatisfiable(i2003_11_14_17_18_{2750}) fof(axiom_6, axiom)
$\forall x, y$: (rf_3(x, y) $\Rightarrow$ rf_1(x, y)) fof(axiom_7, axiom)
$\forall x, y$: (rf_3(x, y) $\Rightarrow$ rf_2(x, y)) fof(axiom_8, axiom)

KRS071+1.p DL Test: t1.2
$\forall a, b$: (($a = b$ and cUnsatisfiable(a)) $\Rightarrow$ cUnsatisfiable(b)) fof(cUnsatisfiable_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cp_1(a)) $\Rightarrow$ cp_1(b)) fof(cp1_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cp_2(a)) $\Rightarrow$ cp_2(b)) fof(cp2_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cp_3(a)) $\Rightarrow$ cp_3(b)) fof(cp3_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cp_4(a)) $\Rightarrow$ cp_4(b)) fof(cp4_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cp_5(a)) $\Rightarrow$ cp_5(b)) fof(cp5_substitution_1, axiom)
$\forall a, b, c$: (($a = b$ and rinvR(a, c)) $\Rightarrow$ rinvR(b, c)) fof(rinvR_substitution_1, axiom)
$\forall a, b, c$: (($a = b$ and rinvR(c, a)) $\Rightarrow$ rinvR(c, b)) fof(rinvR_substitution_2, axiom)
$\forall a, b, c$: (($a = b$ and rr(a, c)) $\Rightarrow$ rr(b, c)) fof(rr_substitution_1, axiom)
$\forall a, b, c$: (($a = b$ and rr(c, a)) $\Rightarrow$ rr(c, b)) fof(rr_substitution_2, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution_1, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution_1, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom_0, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom_1, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ ($\exists y$: (rr(x, y) and cp_1(y)) and $\exists y$: (rr(x, y) and cp_2(y)) and $\exists y$: (rr(x, y) and cp_3(y)) and $\forall y_0, y_1$
($y_0 = y_1$ or $y_0 = y_2$ or $y_1 = y_2$)))) fof(axiom_2, axiom)
$\forall x$: (cp_1(x) $\Rightarrow$ $\neg$ cp_4(x) or cp_2(x) or cp_3(x) or cp_5(x)) fof(axiom_3, axiom)
$\forall x$: (cp_2(x) $\Rightarrow$ $\neg$ cp_4(x) or cp_3(x) or cp_5(x)) fof(axiom_4, axiom)
$\forall x$: (cp_3(x) $\Rightarrow$ $\neg$ cp_4(x) or cp_5(x)) fof(axiom_5, axiom)
$\forall x$: (cp_4(x) $\Rightarrow$ $\neg$ cp_5(x)) fof(axiom_6, axiom)
$\forall x, y$: (rinvR(x, y) $\iff$ rr(y, x)) fof(axiom_7, axiom)
cUnsatisfiable(i2003_11_14_17_18_{39380}) fof(axiom_8, axiom)

KRS072+1.p DL Test: t1.3
$\forall a, b$: (($a = b$ and cUnsatisfiable(a)) $\Rightarrow$ cUnsatisfiable(b)) fof(cUnsatisfiable_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution_1, axiom)

$\forall a, b$: $((a = b$ and cowlThing$(a)) \Rightarrow$ cowlThing$(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$_1(a)) \Rightarrow$ cp$_1(b))$ fof(cp1_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$_2(a)) \Rightarrow$ cp$_2(b))$ fof(cp2_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$_3(a)) \Rightarrow$ cp$_3(b))$ fof(cp3_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$_4(a)) \Rightarrow$ cp$_4(b))$ fof(cp4_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$_5(a)) \Rightarrow$ cp$_5(b))$ fof(cp5_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rinvR$(a, c)) \Rightarrow$ rinvR$(b, c))$ fof(rinvR_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rinvR$(c, a)) \Rightarrow$ rinvR$(c, b))$ fof(rinvR_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and rr$(a, c)) \Rightarrow$ rr$(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rr$(c, a)) \Rightarrow$ rr$(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b$: $((a = b$ and xsd_integer$(a)) \Rightarrow$ xsd_integer$(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and xsd_string$(a)) \Rightarrow$ xsd_string$(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing$(x))$ fof(axiom$_0$, axiom)
$\forall x$: (xsd_string$(x) \iff \neg$ xsd_integer$(x))$ fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable$(x) \iff (\exists y$: (rinvR(x, y) and $\forall z_0, z_1$: ((rr(y, z_0) and rr$(y, z_1)) \Rightarrow z_0 = z_1)$ and $\exists z$: (rr(y, z) and cp$_1(z)))$
$\forall x$: (cp$_1(x) \Rightarrow \neg$ cp$_3(x)$ or cp$_2(x)$ or cp$_4(x)$ or cp$_5(x))$ fof(axiom$_3$, axiom)
$\forall x$: (cp$_2(x) \Rightarrow \neg$ cp$_3(x)$ or cp$_4(x)$ or cp$_5(x))$ fof(axiom$_4$, axiom)
$\forall x$: (cp$_3(x) \Rightarrow \neg$ cp$_4(x)$ or cp$_5(x))$ fof(axiom$_5$, axiom)
$\forall x$: (cp$_4(x) \Rightarrow \neg$ cp$_5(x))$ fof(axiom$_6$, axiom)
$\forall x, y$: (rinvR$(x, y) \iff$ rr$(y, x))$ fof(axiom$_7$, axiom)
cUnsatisfiable(i2003_11_14_17_18$_{50190}$) fof(axiom$_8$, axiom)

KRS077+1.p DL Test: t11.1
$\forall a, b$: $((a = b$ and cUnsatisfiable$(a)) \Rightarrow$ cUnsatisfiable$(b))$ fof(cUnsatisfiable_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlNothing$(a)) \Rightarrow$ cowlNothing$(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlThing$(a)) \Rightarrow$ cowlThing$(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$(a)) \Rightarrow$ cp$(b))$ fof(cp_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rinvS$(a, c)) \Rightarrow$ rinvS$(b, c))$ fof(rinvS_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rinvS$(c, a)) \Rightarrow$ rinvS$(c, b))$ fof(rinvS_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and rr$(a, c)) \Rightarrow$ rr$(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rr$(c, a)) \Rightarrow$ rr$(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and rs$(a, c)) \Rightarrow$ rs$(b, c))$ fof(rs_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rs$(c, a)) \Rightarrow$ rs$(c, b))$ fof(rs_substitution$_2$, axiom)
$\forall a, b$: $((a = b$ and xsd_integer$(a)) \Rightarrow$ xsd_integer$(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and xsd_string$(a)) \Rightarrow$ xsd_string$(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing$(x))$ fof(axiom$_0$, axiom)
$\forall x$: (xsd_string$(x) \iff \neg$ xsd_integer$(x))$ fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable$(x) \iff (\forall y_0, y_1$: ((rr$(x, y_0)$ and rr$(x, y_1)) \Rightarrow y_0 = y_1)$ and $\exists y$: (rr(x, y) and $\forall z$: (rinvS$(y, z) \Rightarrow$ cp$(z)))$ and $\neg$ cp(x) and $\exists y$: (rs(x, y) and cp$(y))))$ fof(axiom$_2$, axiom)
$\forall x, y$: (rinvS$(x, y) \iff$ rs$(y, x))$ fof(axiom$_3$, axiom)
cUnsatisfiable(i2003_11_14_17_19$_{09372}$) fof(axiom$_4$, axiom)
$\forall x, y$: (rs$(x, y) \Rightarrow$ rr$(x, y))$ fof(axiom$_5$, axiom)

KRS078+1.p DL Test: t12.1
$\forall a, b$: $((a = b$ and cUnsatisfiable$(a)) \Rightarrow$ cUnsatisfiable$(b))$ fof(cUnsatisfiable_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlNothing$(a)) \Rightarrow$ cowlNothing$(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cowlThing$(a)) \Rightarrow$ cowlThing$(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cp$(a)) \Rightarrow$ cp$(b))$ fof(cp_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and cq$(a)) \Rightarrow$ cq$(b))$ fof(cq_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rinvR$(a, c)) \Rightarrow$ rinvR$(b, c))$ fof(rinvR_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rinvR$(c, a)) \Rightarrow$ rinvR$(c, b))$ fof(rinvR_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and rr$(a, c)) \Rightarrow$ rr$(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rr$(c, a)) \Rightarrow$ rr$(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and rs$(a, c)) \Rightarrow$ rs$(b, c))$ fof(rs_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and rs$(c, a)) \Rightarrow$ rs$(c, b))$ fof(rs_substitution$_2$, axiom)
$\forall a, b$: $((a = b$ and xsd_integer$(a)) \Rightarrow$ xsd_integer$(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and xsd_string$(a)) \Rightarrow$ xsd_string$(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing$(x))$ fof(axiom$_0$, axiom)
$\forall x$: (xsd_string$(x) \iff \neg$ xsd_integer$(x))$ fof(axiom$_1$, axiom)

$\forall x\colon (\text{cUnsatisfiable}(x) \iff (\exists y\colon (\text{rr}(x, y) \text{ and } \exists z\colon (\text{rinvR}(y, z) \text{ and } \forall w\colon (\text{rs}(z, w) \Rightarrow \text{cp}(w))) \text{ and } \forall z_0, z_1\colon ((\text{rinvR}(y, z_0) \text{ and r}$
$z_0 = z_1)) \text{ and } \exists y\colon (\text{rs}(x, y) \text{ and } \neg\,\text{cq}(y) \text{ and } \neg\,\text{cp}(y)))) \quad \text{fof}(\text{axiom}_2, \text{axiom})$
$\forall x, y\colon (\text{rinvR}(x, y) \iff \text{rr}(y, x)) \quad \text{fof}(\text{axiom}_3, \text{axiom})$
$\text{cUnsatisfiable}(\text{i2003\_11\_14\_17\_19}_{13721}) \quad \text{fof}(\text{axiom}_4, \text{axiom})$

KRS079+1.p DL Test: t2.2
$\forall a, b\colon ((a = b \text{ and cUnsatisfiable}(a)) \Rightarrow \text{cUnsatisfiable}(b)) \quad \text{fof}(\text{cUnsatisfiable\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and cowlNothing}(a)) \Rightarrow \text{cowlNothing}(b)) \quad \text{fof}(\text{cowlNothing\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and cowlThing}(a)) \Rightarrow \text{cowlThing}(b)) \quad \text{fof}(\text{cowlThing\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and cp}_1(a)) \Rightarrow \text{cp}_1(b)) \quad \text{fof}(\text{cp1\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and cp}_2(a)) \Rightarrow \text{cp}_2(b)) \quad \text{fof}(\text{cp2\_substitution}_1, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rf}_1(a, c)) \Rightarrow \text{rf}_1(b, c)) \quad \text{fof}(\text{rf1\_substitution}_1, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rf}_1(c, a)) \Rightarrow \text{rf}_1(c, b)) \quad \text{fof}(\text{rf1\_substitution}_2, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rf}_2(a, c)) \Rightarrow \text{rf}_2(b, c)) \quad \text{fof}(\text{rf2\_substitution}_1, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rf}_2(c, a)) \Rightarrow \text{rf}_2(c, b)) \quad \text{fof}(\text{rf2\_substitution}_2, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rr}(a, c)) \Rightarrow \text{rr}(b, c)) \quad \text{fof}(\text{rr\_substitution}_1, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rr}(c, a)) \Rightarrow \text{rr}(c, b)) \quad \text{fof}(\text{rr\_substitution}_2, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and xsd\_integer}(a)) \Rightarrow \text{xsd\_integer}(b)) \quad \text{fof}(\text{xsd\_integer\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and xsd\_string}(a)) \Rightarrow \text{xsd\_string}(b)) \quad \text{fof}(\text{xsd\_string\_substitution}_1, \text{axiom})$
$\forall x\colon (\text{cowlThing}(x) \text{ and } \neg\,\text{cowlNothing}(x)) \quad \text{fof}(\text{axiom}_0, \text{axiom})$
$\forall x\colon (\text{xsd\_string}(x) \iff \neg\,\text{xsd\_integer}(x)) \quad \text{fof}(\text{axiom}_1, \text{axiom})$
$\forall x\colon (\text{cUnsatisfiable}(x) \iff (\exists y\colon (\text{rf}_2(x, y) \text{ and cp}_2(y)) \text{ and } \exists y\colon (\text{rf}_1(x, y) \text{ and cp}_1(y)) \text{ and } \exists y\colon (\text{rr}(x, y) \text{ and cowlThing}(y))))$
$\forall x\colon (\text{cp}_1(x) \Rightarrow \neg\,\text{cp}_2(x)) \quad \text{fof}(\text{axiom}_3, \text{axiom})$
$\forall x\colon (\text{cowlThing}(x) \Rightarrow \forall y_0, y_1\colon ((\text{rf}_1(x, y_0) \text{ and rf}_1(x, y_1)) \Rightarrow y_0 = y_1)) \quad \text{fof}(\text{axiom}_4, \text{axiom})$
$\forall x\colon (\text{cowlThing}(x) \Rightarrow \forall y_0, y_1\colon ((\text{rf}_2(x, y_0) \text{ and rf}_2(x, y_1)) \Rightarrow y_0 = y_1)) \quad \text{fof}(\text{axiom}_5, \text{axiom})$
$\text{cUnsatisfiable}(\text{i2003\_11\_14\_17\_19}_{17492}) \quad \text{fof}(\text{axiom}_6, \text{axiom})$
$\forall x, y\colon (\text{rr}(x, y) \Rightarrow \text{rf}_1(x, y)) \quad \text{fof}(\text{axiom}_7, \text{axiom})$
$\forall x, y\colon (\text{rr}(x, y) \Rightarrow \text{rf}_2(x, y)) \quad \text{fof}(\text{axiom}_8, \text{axiom})$

KRS082+1.p DL Test: t4.1 Dynamic blocking example
$\forall x\colon (\text{cowlThing}(x) \text{ and } \neg\,\text{cowlNothing}(x)) \quad \text{fof}(\text{axiom}_0, \text{axiom})$
$\forall x\colon (\text{xsd\_string}(x) \iff \neg\,\text{xsd\_integer}(x)) \quad \text{fof}(\text{axiom}_1, \text{axiom})$
$\forall x\colon (\text{cUnsatisfiable}(x) \Rightarrow \exists y\colon (\text{rs}(x, y) \text{ and } \exists z\colon (\text{rp}(y, z) \text{ and cowlThing}(z)) \text{ and } \forall z\colon (\text{rr}(y, z) \Rightarrow \text{cc}(z)) \text{ and } \forall z\colon (\text{rp}(y, z) \Rightarrow \exists w\colon (\text{rr}(z, w) \text{ and cowlThing}(w))) \text{ and } \forall z\colon (\text{rp}(y, z) \Rightarrow \exists w\colon (\text{rp}(z, w) \text{ and cowlThing}(w))) \text{ and } \forall z\colon (\text{rp}(y, z) \Rightarrow \forall w\colon (\text{rr}(z, w) \Rightarrow \text{cc}(w))) \text{ and } \exists z\colon (\text{rr}(y, z) \text{ and cowlThing}(z)))) \quad \text{fof}(\text{axiom}_2, \text{axiom})$
$\forall x\colon (\text{cUnsatisfiable}(x) \Rightarrow \text{ca}(x)) \quad \text{fof}(\text{axiom}_3, \text{axiom})$
$\forall x\colon (\text{cc}(x) \iff \forall y\colon (\text{rinvR}(x, y) \Rightarrow \forall z\colon (\text{rinvP}(y, z) \Rightarrow \forall w\colon (\text{rinvS}(z, w) \Rightarrow \neg\,\text{ca}(w))))) \quad \text{fof}(\text{axiom}_4, \text{axiom})$
$\forall x, y\colon (\text{rinvP}(x, y) \iff \text{rp}(y, x)) \quad \text{fof}(\text{axiom}_5, \text{axiom})$
$\forall x, y\colon (\text{rinvR}(x, y) \iff \text{rr}(y, x)) \quad \text{fof}(\text{axiom}_6, \text{axiom})$
$\forall x, y\colon (\text{rinvS}(x, y) \iff \text{rs}(y, x)) \quad \text{fof}(\text{axiom}_7, \text{axiom})$
$\forall x, y, z\colon ((\text{rp}(x, y) \text{ and rp}(y, z)) \Rightarrow \text{rp}(x, z)) \quad \text{fof}(\text{axiom}_8, \text{axiom})$
$\text{cUnsatisfiable}(\text{i2003\_11\_14\_17\_19}_{28752}) \quad \text{fof}(\text{axiom}_9, \text{axiom})$

KRS083+1.p DL Test: t6.1 Double blocking example
$\forall a, b\colon ((a = b \text{ and cUnsatisfiable}(a)) \Rightarrow \text{cUnsatisfiable}(b)) \quad \text{fof}(\text{cUnsatisfiable\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and cc}(a)) \Rightarrow \text{cc}(b)) \quad \text{fof}(\text{cc\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and cd}(a)) \Rightarrow \text{cd}(b)) \quad \text{fof}(\text{cd\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and cowlNothing}(a)) \Rightarrow \text{cowlNothing}(b)) \quad \text{fof}(\text{cowlNothing\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and cowlThing}(a)) \Rightarrow \text{cowlThing}(b)) \quad \text{fof}(\text{cowlThing\_substitution}_1, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rf}(a, c)) \Rightarrow \text{rf}(b, c)) \quad \text{fof}(\text{rf\_substitution}_1, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rf}(c, a)) \Rightarrow \text{rf}(c, b)) \quad \text{fof}(\text{rf\_substitution}_2, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rinvF}(a, c)) \Rightarrow \text{rinvF}(b, c)) \quad \text{fof}(\text{rinvF\_substitution}_1, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rinvF}(c, a)) \Rightarrow \text{rinvF}(c, b)) \quad \text{fof}(\text{rinvF\_substitution}_2, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rinvR}(a, c)) \Rightarrow \text{rinvR}(b, c)) \quad \text{fof}(\text{rinvR\_substitution}_1, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rinvR}(c, a)) \Rightarrow \text{rinvR}(c, b)) \quad \text{fof}(\text{rinvR\_substitution}_2, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rr}(a, c)) \Rightarrow \text{rr}(b, c)) \quad \text{fof}(\text{rr\_substitution}_1, \text{axiom})$
$\forall a, b, c\colon ((a = b \text{ and rr}(c, a)) \Rightarrow \text{rr}(c, b)) \quad \text{fof}(\text{rr\_substitution}_2, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and xsd\_integer}(a)) \Rightarrow \text{xsd\_integer}(b)) \quad \text{fof}(\text{xsd\_integer\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and xsd\_string}(a)) \Rightarrow \text{xsd\_string}(b)) \quad \text{fof}(\text{xsd\_string\_substitution}_1, \text{axiom})$
$\forall x\colon (\text{cowlThing}(x) \text{ and } \neg\,\text{cowlNothing}(x)) \quad \text{fof}(\text{axiom}_0, \text{axiom})$
$\forall x\colon (\text{xsd\_string}(x) \iff \neg\,\text{xsd\_integer}(x)) \quad \text{fof}(\text{axiom}_1, \text{axiom})$

$\forall x$: (cUnsatisfiable(x) $\iff$ ($\forall y$: (rinvR(x,y) $\Rightarrow$ $\exists z$: (rinvF(y,z) and cd(z))) and $\neg$ cc(x) and $\exists y$: (rinvF(x,y) and cd(y))))
$\forall x$: (cd(x) $\iff$ ($\exists y$: (rf(x,y) and $\neg$ cc(y)) and cc(x))) fof(axiom_3, axiom)
$\forall x$: (cowlThing(x) $\Rightarrow$ $\forall y_0, y_1$: ((rf(x,y_0) and rf(x,y_1)) $\Rightarrow$ $y_0 = y_1$)) fof(axiom_4, axiom)
$\forall x, y$: (rinvF(x,y) $\iff$ rf(y,x)) fof(axiom_5, axiom)
$\forall x, y$: (rinvR(x,y) $\iff$ rr(y,x)) fof(axiom_6, axiom)
$\forall x, y, z$: ((rr(x,y) and rr(y,z)) $\Rightarrow$ rr(x,z)) fof(axiom_7, axiom)
cUnsatisfiable($\text{i2003\_11\_14\_17\_19}_{32337}$) fof($\text{axiom}_8$, axiom)
$\forall x, y$: (rf(x,y) $\Rightarrow$ rr(x,y)) fof(axiom_9, axiom)

KRS084+1.p DL Test: t6f.1 Double blocking example
$\forall a, b$: (($a = b$ and cUnsatisfiable(a)) $\Rightarrow$ cUnsatisfiable(b)) fof($\text{cUnsatisfiable\_substitution}_1$, axiom)
$\forall a, b$: (($a = b$ and cc(a)) $\Rightarrow$ cc(b)) fof(cc_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cd(a)) $\Rightarrow$ cd(b)) fof(cd_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof($\text{cowlNothing\_substitution}_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof($\text{cowlThing\_substitution}_1$, axiom)
$\forall a, b, c$: (($a = b$ and rf(a,c)) $\Rightarrow$ rf(b,c)) fof(rf_substitution_1, axiom)
$\forall a, b, c$: (($a = b$ and rf(c,a)) $\Rightarrow$ rf(c,b)) fof(rf_substitution_2, axiom)
$\forall a, b, c$: (($a = b$ and rinvF(a,c)) $\Rightarrow$ rinvF(b,c)) fof($\text{rinvF\_substitution}_1$, axiom)
$\forall a, b, c$: (($a = b$ and rinvF(c,a)) $\Rightarrow$ rinvF(c,b)) fof($\text{rinvF\_substitution}_2$, axiom)
$\forall a, b, c$: (($a = b$ and rinvR(a,c)) $\Rightarrow$ rinvR(b,c)) fof($\text{rinvR\_substitution}_1$, axiom)
$\forall a, b, c$: (($a = b$ and rinvR(c,a)) $\Rightarrow$ rinvR(c,b)) fof($\text{rinvR\_substitution}_2$, axiom)
$\forall a, b, c$: (($a = b$ and rr(a,c)) $\Rightarrow$ rr(b,c)) fof(rr_substitution_1, axiom)
$\forall a, b, c$: (($a = b$ and rr(c,a)) $\Rightarrow$ rr(c,b)) fof(rr_substitution_2, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof($\text{xsd\_integer\_substitution}_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof($\text{xsd\_string\_substitution}_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom_0, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom_1, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ ($\exists y$: (rinvF(x,y) and cd(y)) and $\forall y$: (rinvR(x,y) $\Rightarrow$ $\exists z$: (rinvF(y,z) and cd(z))) and $\neg$ cc(x)))
$\forall x$: (cd(x) $\iff$ ($\exists y$: (rf(x,y) and $\neg$ cc(y)) and cc(x))) fof(axiom_3, axiom)
$\forall x, y, z$: ((rf(x,y) and rf(x,z)) $\Rightarrow$ $y = z$) fof(axiom_4, axiom)
$\forall x, y$: (rinvF(x,y) $\iff$ rf(y,x)) fof(axiom_5, axiom)
$\forall x, y$: (rinvR(x,y) $\iff$ rr(y,x)) fof(axiom_6, axiom)
$\forall x, y, z$: ((rr(x,y) and rr(y,z)) $\Rightarrow$ rr(x,z)) fof(axiom_7, axiom)
cUnsatisfiable($\text{i2003\_11\_14\_17\_19}_{35232}$) fof($\text{axiom}_8$, axiom)
$\forall x, y$: (rf(x,y) $\Rightarrow$ rr(x,y)) fof(axiom_9, axiom)

KRS085+1.p DL Test: t7.2
$\forall a, b$: (($a = b$ and cUnsatisfiable(a)) $\Rightarrow$ cUnsatisfiable(b)) fof($\text{cUnsatisfiable\_substitution}_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof($\text{cowlNothing\_substitution}_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof($\text{cowlThing\_substitution}_1$, axiom)
$\forall a, b$: (($a = b$ and $\text{cp}_1(a)$) $\Rightarrow$ $\text{cp}_1(b)$) fof($\text{cp1\_substitution}_1$, axiom)
$\forall a, b, c$: (($a = b$ and rf(a,c)) $\Rightarrow$ rf(b,c)) fof(rf_substitution_1, axiom)
$\forall a, b, c$: (($a = b$ and rf(c,a)) $\Rightarrow$ rf(c,b)) fof(rf_substitution_2, axiom)
$\forall a, b, c$: (($a = b$ and rinvF(a,c)) $\Rightarrow$ rinvF(b,c)) fof($\text{rinvF\_substitution}_1$, axiom)
$\forall a, b, c$: (($a = b$ and rinvF(c,a)) $\Rightarrow$ rinvF(c,b)) fof($\text{rinvF\_substitution}_2$, axiom)
$\forall a, b, c$: (($a = b$ and rinvR(a,c)) $\Rightarrow$ rinvR(b,c)) fof($\text{rinvR\_substitution}_1$, axiom)
$\forall a, b, c$: (($a = b$ and rinvR(c,a)) $\Rightarrow$ rinvR(c,b)) fof($\text{rinvR\_substitution}_2$, axiom)
$\forall a, b, c$: (($a = b$ and rr(a,c)) $\Rightarrow$ rr(b,c)) fof(rr_substitution_1, axiom)
$\forall a, b, c$: (($a = b$ and rr(c,a)) $\Rightarrow$ rr(c,b)) fof(rr_substitution_2, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof($\text{xsd\_integer\_substitution}_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof($\text{xsd\_string\_substitution}_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom_0, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom_1, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ ($\exists y$: (rr(x,y) and $\exists z$: (rr(y,z) and $\text{cp}_1(z)$ and $\forall w$: (rinvR(z,w) $\Rightarrow$ $\neg\,\text{cp}_1(w)$))) and $\text{cp}_1(x)$))
$\forall x$: (cowlThing(x) $\Rightarrow$ $\forall y_0, y_1$: ((rf(x,y_0) and rf(x,y_1)) $\Rightarrow$ $y_0 = y_1$)) fof(axiom_3, axiom)
$\forall x, y$: (rinvF(x,y) $\iff$ rf(y,x)) fof(axiom_4, axiom)
$\forall x, y$: (rinvR(x,y) $\iff$ rr(y,x)) fof(axiom_5, axiom)
$\forall x, y, z$: ((rr(x,y) and rr(y,z)) $\Rightarrow$ rr(x,z)) fof(axiom_6, axiom)
cUnsatisfiable($\text{i2003\_11\_14\_17\_19}_{39537}$) fof($\text{axiom}_7$, axiom)

KRS086+1.p DL Test: t7.3

$\forall a, b\colon ((a = b \text{ and } \mathrm{cUnsatisfiable}(a)) \Rightarrow \mathrm{cUnsatisfiable}(b))$ fof(cUnsatisfiable_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlNothing}(a)) \Rightarrow \mathrm{cowlNothing}(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlThing}(a)) \Rightarrow \mathrm{cowlThing}(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cp}_1(a)) \Rightarrow \mathrm{cp}_1(b))$ fof(cp1_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rf}(a, c)) \Rightarrow \mathrm{rf}(b, c))$ fof(rf_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rf}(c, a)) \Rightarrow \mathrm{rf}(c, b))$ fof(rf_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvF}(a, c)) \Rightarrow \mathrm{rinvF}(b, c))$ fof(rinvF_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvF}(c, a)) \Rightarrow \mathrm{rinvF}(c, b))$ fof(rinvF_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvR}(a, c)) \Rightarrow \mathrm{rinvR}(b, c))$ fof(rinvR_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvR}(c, a)) \Rightarrow \mathrm{rinvR}(c, b))$ fof(rinvR_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(a, c)) \Rightarrow \mathrm{rr}(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(c, a)) \Rightarrow \mathrm{rr}(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_integer}(a)) \Rightarrow \mathrm{xsd\_integer}(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_string}(a)) \Rightarrow \mathrm{xsd\_string}(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg\, \mathrm{cowlNothing}(x))$ fof(axiom$_0$, axiom)
$\forall x\colon (\mathrm{xsd\_string}(x) \iff \neg\, \mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x\colon (\mathrm{cUnsatisfiable}(x) \iff \exists y\colon (\mathrm{rf}(x, y) \text{ and } \exists z\colon (\mathrm{rinvF}(y, z) \text{ and } \exists w\colon (\mathrm{rf}(z, w) \text{ and } \neg\, \mathrm{cp}_1(w))) \text{ and } \mathrm{cp}_1(y)))$ fof(axiom$_2$, a
$\forall x\colon (\mathrm{cowlThing}(x) \Rightarrow \forall y_0, y_1\colon ((\mathrm{rf}(x, y_0) \text{ and } \mathrm{rf}(x, y_1)) \Rightarrow y_0 = y_1))$ fof(axiom$_3$, axiom)
$\forall x, y\colon (\mathrm{rinvF}(x, y) \iff \mathrm{rf}(y, x))$ fof(axiom$_4$, axiom)
$\forall x, y\colon (\mathrm{rinvR}(x, y) \iff \mathrm{rr}(y, x))$ fof(axiom$_5$, axiom)
$\forall x, y, z\colon ((\mathrm{rr}(x, y) \text{ and } \mathrm{rr}(y, z)) \Rightarrow \mathrm{rr}(x, z))$ fof(axiom$_6$, axiom)
cUnsatisfiable(i2003_11_14_17_19$_{42328}$) fof(axiom$_7$, axiom)

KRS087+1.p DL Test: t7f.2
$\forall a, b\colon ((a = b \text{ and } \mathrm{cUnsatisfiable}(a)) \Rightarrow \mathrm{cUnsatisfiable}(b))$ fof(cUnsatisfiable_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlNothing}(a)) \Rightarrow \mathrm{cowlNothing}(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlThing}(a)) \Rightarrow \mathrm{cowlThing}(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cp}_1(a)) \Rightarrow \mathrm{cp}_1(b))$ fof(cp1_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rf}(a, c)) \Rightarrow \mathrm{rf}(b, c))$ fof(rf_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rf}(c, a)) \Rightarrow \mathrm{rf}(c, b))$ fof(rf_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvF}(a, c)) \Rightarrow \mathrm{rinvF}(b, c))$ fof(rinvF_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvF}(c, a)) \Rightarrow \mathrm{rinvF}(c, b))$ fof(rinvF_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvR}(a, c)) \Rightarrow \mathrm{rinvR}(b, c))$ fof(rinvR_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvR}(c, a)) \Rightarrow \mathrm{rinvR}(c, b))$ fof(rinvR_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(a, c)) \Rightarrow \mathrm{rr}(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(c, a)) \Rightarrow \mathrm{rr}(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_integer}(a)) \Rightarrow \mathrm{xsd\_integer}(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_string}(a)) \Rightarrow \mathrm{xsd\_string}(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg\, \mathrm{cowlNothing}(x))$ fof(axiom$_0$, axiom)
$\forall x\colon (\mathrm{xsd\_string}(x) \iff \neg\, \mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x\colon (\mathrm{cUnsatisfiable}(x) \iff (\mathrm{cp}_1(x) \text{ and } \exists y\colon (\mathrm{rr}(x, y) \text{ and } \exists z\colon (\mathrm{rr}(y, z) \text{ and } \forall w\colon (\mathrm{rinvR}(z, w) \Rightarrow \neg\, \mathrm{cp}_1(w)) \text{ and } \mathrm{cp}_1(z)))))$
$\forall x, y, z\colon ((\mathrm{rf}(x, y) \text{ and } \mathrm{rf}(x, z)) \Rightarrow y = z)$ fof(axiom$_3$, axiom)
$\forall x, y\colon (\mathrm{rinvF}(x, y) \iff \mathrm{rf}(y, x))$ fof(axiom$_4$, axiom)
$\forall x, y\colon (\mathrm{rinvR}(x, y) \iff \mathrm{rr}(y, x))$ fof(axiom$_5$, axiom)
$\forall x, y, z\colon ((\mathrm{rr}(x, y) \text{ and } \mathrm{rr}(y, z)) \Rightarrow \mathrm{rr}(x, z))$ fof(axiom$_6$, axiom)
cUnsatisfiable(i2003_11_14_17_19$_{46763}$) fof(axiom$_7$, axiom)

KRS088+1.p DL Test: t7f.3
$\forall a, b\colon ((a = b \text{ and } \mathrm{cUnsatisfiable}(a)) \Rightarrow \mathrm{cUnsatisfiable}(b))$ fof(cUnsatisfiable_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlNothing}(a)) \Rightarrow \mathrm{cowlNothing}(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlThing}(a)) \Rightarrow \mathrm{cowlThing}(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cp}_1(a)) \Rightarrow \mathrm{cp}_1(b))$ fof(cp1_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rf}(a, c)) \Rightarrow \mathrm{rf}(b, c))$ fof(rf_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rf}(c, a)) \Rightarrow \mathrm{rf}(c, b))$ fof(rf_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvF}(a, c)) \Rightarrow \mathrm{rinvF}(b, c))$ fof(rinvF_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvF}(c, a)) \Rightarrow \mathrm{rinvF}(c, b))$ fof(rinvF_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvR}(a, c)) \Rightarrow \mathrm{rinvR}(b, c))$ fof(rinvR_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rinvR}(c, a)) \Rightarrow \mathrm{rinvR}(c, b))$ fof(rinvR_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(a, c)) \Rightarrow \mathrm{rr}(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(c, a)) \Rightarrow \mathrm{rr}(c, b))$ fof(rr_substitution$_2$, axiom)

$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ $\exists y$: (rf(x, y) and $\forall z$: (rinvF(y, z) $\Rightarrow$ $\exists w$: (rf(z, w) and $\neg$ cp$_1$(w))) and cp$_1$(y))) fof(axiom$_2$, ax
$\forall x, y, z$: ((rf(x, y) and rf(x, z)) $\Rightarrow$ $y = z$) fof(axiom$_3$, axiom)
$\forall x, y$: (rinvF(x, y) $\iff$ rf(y, x)) fof(axiom$_4$, axiom)
$\forall x, y$: (rinvR(x, y) $\iff$ rr(y, x)) fof(axiom$_5$, axiom)
$\forall x, y, z$: ((rr(x, y) and rr(y, z)) $\Rightarrow$ rr(x, z)) fof(axiom$_6$, axiom)
cUnsatisfiable(i2003_11_14_17_19$_{49673}$) fof(axiom$_7$, axiom)

KRS089+1.p A test for the interaction of one-of and inverse
A test for the interaction of one-of and inverse using the idea of a spy point. Everything is related to the spy via the property p and we know that the spy has at most two invP successors, thus limiting the cardinality of the domain to being at most 2.
$\forall a, b$: (($a = b$ and cUnsatisfiable(a)) $\Rightarrow$ cUnsatisfiable(b)) fof(cUnsatisfiable_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rinvP(a, c)) $\Rightarrow$ rinvP(b, c)) fof(rinvP_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rinvP(c, a)) $\Rightarrow$ rinvP(c, b)) fof(rinvP_substitution$_2$, axiom)
$\forall a, b, c$: (($a = b$ and rp(a, c)) $\Rightarrow$ rp(b, c)) fof(rp_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rp(c, a)) $\Rightarrow$ rp(c, b)) fof(rp_substitution$_2$, axiom)
$\forall a, b, c$: (($a = b$ and rr(a, c)) $\Rightarrow$ rr(b, c)) fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rr(c, a)) $\Rightarrow$ rr(c, b)) fof(rr_substitution$_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\Rightarrow$ $\exists y_0, y_1, y_2$: (rr(x, y_0) and rr(x, y_1) and rr(x, y_2) and $y_0 \neq y_1$ and $y_0 \neq y_2$ and $y_1 \neq y_2$)) fof(axiom$_2$, axiom)
$\forall x$: (cowlThing(x) $\Rightarrow$ $\exists y$: (rp(x, y) and $y =$ ispy)) fof(axiom$_3$, axiom)
$\forall x, y$: (rp(x, y) $\iff$ rinvP(y, x)) fof(axiom$_4$, axiom)
$\forall x_0, x_1, x_2$: ((rinvP(ispy, x_0) and rinvP(ispy, x_1) and rinvP(ispy, x_2)) $\Rightarrow$ ($x_0 = x_1$ or $x_0 = x_2$ or $x_1 = x_2$)) fof(axiom$_5$, ax
cowlThing(ispy) fof(axiom$_6$, axiom)
cUnsatisfiable(i2003_11_14_17_19$_{53168}$) fof(axiom$_7$, axiom)

KRS090+1.p A pattern comes up a lot in more complex ontologies
This kind of pattern comes up a lot in more complex ontologies. Failure to cope with this kind of pattern is one of the reasons that many reasoners have been unable to cope with such ontologies.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cC$_1$(x) $\Rightarrow$ ((cB$_5$(x) or cA$_5$(x)) and (cB$_{13}$(x) or cA$_{13}$(x)) and (cA$_1$(x) or cB$_1$(x)) and (cA$_{27}$(x) or cB$_{27}$(x)) and (cA$_4$(x
$\forall x$: (cC$_2$(x) $\Rightarrow$ (($\neg$ cB(x) or cA(x)) and (cB(x) or cA(x)))) fof(axiom$_3$, axiom)
$\forall x$: (cC$_3$(x) $\Rightarrow$ (($\neg$ cB(x) or $\neg$ cA(x)) and (cB(x) or $\neg$ cA(x)))) fof(axiom$_4$, axiom)
$\forall x$: (cC$_4$(x) $\Rightarrow$ $\exists y$: (rR(x, y) and cC$_2$(y))) fof(axiom$_5$, axiom)
$\forall x$: (cC$_5$(x) $\Rightarrow$ $\forall y$: (rR(x, y) $\Rightarrow$ cC$_3$(y))) fof(axiom$_6$, axiom)
$\forall x$: (cTEST(x) $\Rightarrow$ (cC$_4$(x) and cC$_1$(x) and cC$_5$(x))) fof(axiom$_7$, axiom)
cTEST(i2003_11_14_17_19$_{57994}$) fof(axiom$_8$, axiom)

KRS091+1.p DL Test: heinsohn1.1
Tbox tests from [HK+94]
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ (cd(x) and cc(x))) fof(axiom$_2$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ $\neg$ cd(x)) fof(axiom$_3$, axiom)
$\forall x$: (cc$_1$(x) $\Rightarrow$ $\neg$ cd$_1$(x)) fof(axiom$_4$, axiom)
$\forall x$: (cc$_1$(x) $\Rightarrow$ cd$_1$(x)) fof(axiom$_5$, axiom)
$\forall x$: (ce$_3$(x) $\Rightarrow$ cc(x)) fof(axiom$_6$, axiom)
$\forall x$: (cf(x) $\Rightarrow$ cd(x)) fof(axiom$_7$, axiom)
cUnsatisfiable(i2003_11_14_17_20$_{00819}$) fof(axiom$_8$, axiom)

KRS092+1.p DL Test: heinsohn1.2
Tbox tests from [HK+94]
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ ($\exists y$: (rr(x, y) and cowlThing(y)) and $\forall y$: (rr(x, y) $\Rightarrow$ (cd(y) and cc(y))))) fof(axiom$_2$, axiom
$\forall x$: (cc(x) $\Rightarrow$ $\neg$ cd(x)) fof(axiom$_3$, axiom)
$\forall x$: (cc$_1$(x) $\Rightarrow$ cd$_1$(x)) fof(axiom$_4$, axiom)
$\forall x$: (cc$_1$(x) $\Rightarrow$ $\neg$ cd$_1$(x)) fof(axiom$_5$, axiom)
$\forall x$: (ce$_3$(x) $\Rightarrow$ cc(x)) fof(axiom$_6$, axiom)
$\forall x$: (cf(x) $\Rightarrow$ cd(x)) fof(axiom$_7$, axiom)
cUnsatisfiable(i2003_11_14_17_20$_{04172}$) fof(axiom$_8$, axiom)

KRS093+1.p DL Test: heinsohn1.3
Tbox tests from [HK+94]
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ (cf(x) and ce$_3$(x))) fof(axiom$_2$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ $\neg$ cd(x)) fof(axiom$_3$, axiom)
$\forall x$: (cc$_1$(x) $\Rightarrow$ $\neg$ cd$_1$(x)) fof(axiom$_4$, axiom)
$\forall x$: (cc$_1$(x) $\Rightarrow$ cd$_1$(x)) fof(axiom$_5$, axiom)
$\forall x$: (ce$_3$(x) $\Rightarrow$ cc(x)) fof(axiom$_6$, axiom)
$\forall x$: (cf(x) $\Rightarrow$ cd(x)) fof(axiom$_7$, axiom)
cUnsatisfiable(i2003_11_14_17_20$_{07201}$) fof(axiom$_8$, axiom)

KRS094+1.p DL Test: heinsohn1.4
Tbox tests from [HK+94]
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ cc$_1$(x)) fof(axiom$_2$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ $\neg$ cd(x)) fof(axiom$_3$, axiom)
$\forall x$: (cc$_1$(x) $\Rightarrow$ $\neg$ cd$_1$(x)) fof(axiom$_4$, axiom)
$\forall x$: (cc$_1$(x) $\Rightarrow$ cd$_1$(x)) fof(axiom$_5$, axiom)
$\forall x$: (ce$_3$(x) $\Rightarrow$ cc(x)) fof(axiom$_6$, axiom)
$\forall x$: (cf(x) $\Rightarrow$ cd(x)) fof(axiom$_7$, axiom)
cUnsatisfiable(i2003_11_14_17_20$_{11330}$) fof(axiom$_8$, axiom)

KRS095+1.p DL Test: heinsohn2.1
Tbox tests from [HK+94]
$\forall a, b$: (($a = b$ and cUnsatisfiable(a)) $\Rightarrow$ cUnsatisfiable(b)) fof(cUnsatisfiable_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cc(a)) $\Rightarrow$ cc(b)) fof(cc_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cd(a)) $\Rightarrow$ cd(b)) fof(cd_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rr(a, c)) $\Rightarrow$ rr(b, c)) fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rr(c, a)) $\Rightarrow$ rr(c, b)) fof(rr_substitution$_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ ($\exists y_0, y_1$: (rr(x, y_0) and rr(x, y_1) and $y_0 \neq y_1$) and $\forall y_0, y_1$: ((rr(x, y_0) and rr(x, y_1)) $\Rightarrow$ $y_0 = y_1$))) fof(axiom$_2$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ $\neg$ cd(x)) fof(axiom$_3$, axiom)
cUnsatisfiable(i2003_11_14_17_20$_{14253}$) fof(axiom$_4$, axiom)

KRS096+1.p DL Test: heinsohn2.2
Tbox tests from [HK+94]
$\forall a, b$: (($a = b$ and cUnsatisfiable(a)) $\Rightarrow$ cUnsatisfiable(b)) fof(cUnsatisfiable_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cc(a)) $\Rightarrow$ cc(b)) fof(cc_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cd(a)) $\Rightarrow$ cd(b)) fof(cd_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution$_1$, axiom)

$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(a, c)) \Rightarrow \mathrm{rr}(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(c, a)) \Rightarrow \mathrm{rr}(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_integer}(a)) \Rightarrow \mathrm{xsd\_integer}(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_string}(a)) \Rightarrow \mathrm{xsd\_string}(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg \mathrm{cowlNothing}(x))$ fof(axiom$_0$, axiom)
$\forall x\colon (\mathrm{xsd\_string}(x) \iff \neg \mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x\colon (\mathrm{cUnsatisfiable}(x) \iff (\exists y\colon (\mathrm{rr}(x, y) \text{ and } \mathrm{cc}(y)) \text{ and } \exists y\colon (\mathrm{rr}(x, y) \text{ and } \mathrm{cd}(y)) \text{ and } \forall y_0, y_1\colon ((\mathrm{rr}(x, y_0) \text{ and } \mathrm{rr}(x, y_1)) \Rightarrow y_0 = y_1)))$ fof(axiom$_2$, axiom)
$\forall x\colon (\mathrm{cc}(x) \Rightarrow \neg \mathrm{cd}(x))$ fof(axiom$_3$, axiom)
cUnsatisfiable(i2003_11_14_17_20$_{18265}$) fof(axiom$_4$, axiom)

KRS099+1.p DL Test: heinsohn3c.1
Tbox tests from [HK+94]
$\forall a, b\colon ((a = b \text{ and } \mathrm{cUnsatisfiable}(a)) \Rightarrow \mathrm{cUnsatisfiable}(b))$ fof(cUnsatisfiable_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{ca}(a)) \Rightarrow \mathrm{ca}(b))$ fof(ca_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cc}(a)) \Rightarrow \mathrm{cc}(b))$ fof(cc_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cd}(a)) \Rightarrow \mathrm{cd}(b))$ fof(cd_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlNothing}(a)) \Rightarrow \mathrm{cowlNothing}(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlThing}(a)) \Rightarrow \mathrm{cowlThing}(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rtt}(a, c)) \Rightarrow \mathrm{rtt}(b, c))$ fof(rtt_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rtt}(c, a)) \Rightarrow \mathrm{rtt}(c, b))$ fof(rtt_substitution$_2$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_integer}(a)) \Rightarrow \mathrm{xsd\_integer}(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_string}(a)) \Rightarrow \mathrm{xsd\_string}(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg \mathrm{cowlNothing}(x))$ fof(axiom$_0$, axiom)
$\forall x\colon (\mathrm{xsd\_string}(x) \iff \neg \mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x\colon (\mathrm{cUnsatisfiable}(x) \iff (\exists y_0, y_1, y_2\colon (\mathrm{rtt}(x, y_0) \text{ and } \mathrm{rtt}(x, y_1) \text{ and } \mathrm{rtt}(x, y_2) \text{ and } y_0 \neq y_1 \text{ and } y_0 \neq y_2 \text{ and } y_1 \neq y_2) \text{ and } \forall y\colon (\mathrm{rtt}(x, y) \Rightarrow \mathrm{ca}(y)) \text{ and } \forall y_0, y_1\colon ((\mathrm{rtt}(x, y_0) \text{ and } \mathrm{rtt}(x, y_1)) \Rightarrow y_0 = y_1) \text{ and } \forall y_0, y_1\colon ((\mathrm{rtt}(x, y_0) \text{ and } \mathrm{rtt}(x, y_1)) =$
$y_0 = y_1)))$ fof(axiom$_2$, axiom)
$\forall x\colon (\mathrm{ca}(x) \Rightarrow (\mathrm{cd}(x) \text{ or } \mathrm{cc}(x)))$ fof(axiom$_3$, axiom)
$\forall x\colon (\mathrm{cc}(x) \Rightarrow \neg \mathrm{cd}(x))$ fof(axiom$_4$, axiom)
cUnsatisfiable(i2003_11_14_17_20$_{29215}$) fof(axiom$_5$, axiom)

KRS100+1.p DL Test: heinsohn4.1
Tbox tests from [HK+94]
$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg \mathrm{cowlNothing}(x))$ fof(axiom$_0$, axiom)
$\forall x\colon (\mathrm{xsd\_string}(x) \iff \neg \mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x\colon (\mathrm{cUnsatisfiable}(x) \iff (\forall y\colon (\mathrm{rr}(x, y) \Rightarrow (\mathrm{ce}(y) \text{ or } \neg \mathrm{cd}(y))) \text{ and } \forall y\colon (\mathrm{rr}(x, y) \Rightarrow \mathrm{cd}(y)) \text{ and } \exists y\colon (\mathrm{rr}(x, y) \text{ and } \neg \mathrm{ce}(y))))$
$\forall x\colon (\mathrm{cc}(x) \Rightarrow \neg \mathrm{cd}(x))$ fof(axiom$_3$, axiom)
cUnsatisfiable(i2003_11_14_17_20$_{32704}$) fof(axiom$_4$, axiom)

KRS101+1.p DL Test: heinsohn4.2
Tbox tests from [HK+94]
$\forall a, b\colon ((a = b \text{ and } \mathrm{cUnsatisfiable}(a)) \Rightarrow \mathrm{cUnsatisfiable}(b))$ fof(cUnsatisfiable_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cc}(a)) \Rightarrow \mathrm{cc}(b))$ fof(cc_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cd}(a)) \Rightarrow \mathrm{cd}(b))$ fof(cd_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlNothing}(a)) \Rightarrow \mathrm{cowlNothing}(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{cowlThing}(a)) \Rightarrow \mathrm{cowlThing}(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(a, c)) \Rightarrow \mathrm{rr}(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rr}(c, a)) \Rightarrow \mathrm{rr}(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rs}(a, c)) \Rightarrow \mathrm{rs}(b, c))$ fof(rs_substitution$_1$, axiom)
$\forall a, b, c\colon ((a = b \text{ and } \mathrm{rs}(c, a)) \Rightarrow \mathrm{rs}(c, b))$ fof(rs_substitution$_2$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_integer}(a)) \Rightarrow \mathrm{xsd\_integer}(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b\colon ((a = b \text{ and } \mathrm{xsd\_string}(a)) \Rightarrow \mathrm{xsd\_string}(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg \mathrm{cowlNothing}(x))$ fof(axiom$_0$, axiom)
$\forall x\colon (\mathrm{xsd\_string}(x) \iff \neg \mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x\colon (\mathrm{cUnsatisfiable}(x) \iff (\forall y\colon (\mathrm{rr}(x, y) \Rightarrow \mathrm{cd}(y)) \text{ and } \forall y\colon (\mathrm{rr}(x, y) \Rightarrow (\neg \exists z_0, z_1\colon (\mathrm{rs}(y, z_0) \text{ and } \mathrm{rs}(y, z_1) \text{ and } z_0 \neq z_1) \text{ or } \mathrm{cc}(y))) \text{ and } \exists y\colon (\mathrm{rr}(x, y) \text{ and } \neg \forall z_0, z_1\colon ((\mathrm{rs}(y, z_0) \text{ and } \mathrm{rs}(y, z_1)) \Rightarrow z_0 = z_1))))$ fof(axiom$_2$, axiom)
$\forall x\colon (\mathrm{cc}(x) \Rightarrow \neg \mathrm{cd}(x))$ fof(axiom$_3$, axiom)
cUnsatisfiable(i2003_11_14_17_20$_{36582}$) fof(axiom$_4$, axiom)

KRS104+1.p DL Test: fact1.1

If a, b and c are disjoint, then: (a and b) or (b and c) or (c and a) is unsatisfiable.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ $\neg \exists y$: ra_Px$_5$(x, y)) fof(axiom$_2$, axiom)
$\forall x$: (cUnsatisfiablexcomp(x) $\iff$ (ca_Cx$_7$(x) and ca_Cx$_8$(x) and ca_Cx$_6$(x))) fof(axiom$_3$, axiom)
$\forall x$: (cUnsatisfiablexcomp(x) $\iff$ $\exists y_0$: ra_Px$_5$(x, y_0)) fof(axiom$_4$, axiom)
$\forall x$: (ca(x) $\Rightarrow$ ca_Cx$_1$(x)) fof(axiom$_5$, axiom)
$\forall x$: (cb(x) $\iff$ $\exists y_0$: ra_Px$_3$(x, y_0)) fof(axiom$_6$, axiom)
$\forall x$: (cb(x) $\Rightarrow$ ccxcomp(x)) fof(axiom$_7$, axiom)
$\forall x$: (cbxcomp(x) $\iff$ $\neg \exists y$: ra_Px$_3$(x, y)) fof(axiom$_8$, axiom)
$\forall x$: (cc(x) $\iff$ $\exists y_0$: ra_Px$_2$(x, y_0)) fof(axiom$_9$, axiom)
$\forall x$: (ccxcomp(x) $\iff$ $\neg \exists y$: ra_Px$_2$(x, y)) fof(axiom$_{10}$, axiom)
$\forall x$: (ca_Cx$_1$(x) $\iff$ (cbxcomp(x) and ccxcomp(x))) fof(axiom$_{11}$, axiom)
$\forall x$: (ca_Cx$_1$(x) $\iff$ $\exists y_0$: ra_Px$_1$(x, y_0)) fof(axiom$_{12}$, axiom)
$\forall x$: (ca_Cx1xcomp(x) $\iff$ $\neg \exists y$: ra_Px$_1$(x, y)) fof(axiom$_{13}$, axiom)
$\forall x$: (ca_Cx$_6$(x) $\iff$ $\neg \exists y$: ra_Px$_6$(x, y)) fof(axiom$_{14}$, axiom)
$\forall x$: (ca_Cx6xcomp(x) $\iff$ (ca(x) and cb(x))) fof(axiom$_{15}$, axiom)
$\forall x$: (ca_Cx6xcomp(x) $\iff$ $\exists y_0$: ra_Px$_6$(x, y_0)) fof(axiom$_{16}$, axiom)
$\forall x$: (ca_Cx$_7$(x) $\iff$ $\exists y_0$: ra_Px$_7$(x, y_0)) fof(axiom$_{17}$, axiom)
$\forall x$: (ca_Cx7xcomp(x) $\iff$ (cc(x) and ca(x))) fof(axiom$_{18}$, axiom)
$\forall x$: (ca_Cx7xcomp(x) $\iff$ $\neg \exists y$: ra_Px$_7$(x, y)) fof(axiom$_{19}$, axiom)
$\forall x$: (ca_Cx$_8$(x) $\iff$ $\neg \exists y$: ra_Px$_8$(x, y)) fof(axiom$_{20}$, axiom)
$\forall x$: (ca_Cx8xcomp(x) $\iff$ $\exists y_0$: ra_Px$_8$(x, y_0)) fof(axiom$_{21}$, axiom)
$\forall x$: (ca_Cx8xcomp(x) $\iff$ (cc(x) and cb(x))) fof(axiom$_{22}$, axiom)
cUnsatisfiable(i2003_11_14_17_20$_{50869}$) fof(axiom$_{23}$, axiom)

KRS105+1.p DL Test: fact2.1
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\Rightarrow$ cdxcomp(x)) fof(axiom$_2$, axiom)
$\forall x$: (cUnsatisfiable(x) $\Rightarrow$ cc(x)) fof(axiom$_3$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ $\forall y$: (rr(x, y) $\Rightarrow$ cc(y))) fof(axiom$_4$, axiom)
$\forall x$: (cd(x) $\iff$ $\neg \exists y$: ra_Px$_1$(x, y)) fof(axiom$_5$, axiom)
$\forall x$: (cdxcomp(x) $\iff$ $\exists y_0$: ra_Px$_1$(x, y_0)) fof(axiom$_6$, axiom)
$\forall x$: (ca_Ax$_2$(x) $\iff$ $\forall y$: (rr(x, y) $\Rightarrow$ cc(y))) fof(axiom$_7$, axiom)
$\forall x$: (ca_Ax$_2$(x) $\Rightarrow$ cd(x)) fof(axiom$_8$, axiom)
cUnsatisfiable(i2003_11_14_17_20$_{53634}$) fof(axiom$_9$, axiom)

KRS106+1.p DL Test: fact3.1
$\forall a, b$: (($a = b$ and cUnsatisfiable(a)) $\Rightarrow$ cUnsatisfiable(b)) fof(cUnsatisfiable_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cp$_1$(a)) $\Rightarrow$ cp$_1$(b)) fof(cp1_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cp1xcomp(a)) $\Rightarrow$ cp1xcomp(b)) fof(cp1xcomp_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cp$_2$(a)) $\Rightarrow$ cp$_2$(b)) fof(cp2_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and ra_Px$_1$(a, c)) $\Rightarrow$ ra_Px$_1$(b, c)) fof(ra_Px1_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and ra_Px$_1$(c, a)) $\Rightarrow$ ra_Px$_1$(c, b)) fof(ra_Px1_substitution$_2$, axiom)
$\forall a, b, c$: (($a = b$ and rf$_1$(a, c)) $\Rightarrow$ rf$_1$(b, c)) fof(rf1_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rf$_1$(c, a)) $\Rightarrow$ rf$_1$(c, b)) fof(rf1_substitution$_2$, axiom)
$\forall a, b, c$: (($a = b$ and rf$_2$(a, c)) $\Rightarrow$ rf$_2$(b, c)) fof(rf2_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rf$_2$(c, a)) $\Rightarrow$ rf$_2$(c, b)) fof(rf2_substitution$_2$, axiom)
$\forall a, b, c$: (($a = b$ and rf$_3$(a, c)) $\Rightarrow$ rf$_3$(b, c)) fof(rf3_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rf$_3$(c, a)) $\Rightarrow$ rf$_3$(c, b)) fof(rf3_substitution$_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ ($\exists y$: (rf$_3$(x, y) and cp$_2$(y)) and $\exists y$: (rf$_1$(x, y) and cp$_1$(y)) and $\exists y$: (rf$_2$(x, y) and cp1xcomp(y))))
$\forall x$: (cp$_1$(x) $\iff$ $\neg \exists y$: ra_Px$_1$(x, y)) fof(axiom$_3$, axiom)
$\forall x$: (cp1xcomp(x) $\iff$ $\exists y_0$: ra_Px$_1$(x, y_0)) fof(axiom$_4$, axiom)

$\forall x, y, z$: ((rf$_1(x, y)$ and rf$_1(x, z)$) $\Rightarrow$ $y = z$) fof(axiom$_5$, axiom)
$\forall x, y, z$: ((rf$_2(x, y)$ and rf$_2(x, z)$) $\Rightarrow$ $y = z$) fof(axiom$_6$, axiom)
$\forall x, y, z$: ((rf$_3(x, y)$ and rf$_3(x, z)$) $\Rightarrow$ $y = z$) fof(axiom$_7$, axiom)
cUnsatisfiable(i2003_11_14_17_20$_{57644}$) fof(axiom$_8$, axiom)
$\forall x, y$: (rf$_3(x, y)$ $\Rightarrow$ rf$_1(x, y)$) fof(axiom$_9$, axiom)
$\forall x, y$: (rf$_3(x, y)$ $\Rightarrow$ rf$_2(x, y)$) fof(axiom$_{10}$, axiom)

KRS113+1.p DL Test: t11.1
$\forall a, b$: (($a = b$ and cUnsatisfiable(a)) $\Rightarrow$ cUnsatisfiable(b)) fof(cUnsatisfiable_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and ca_Vx$_2(a)$) $\Rightarrow$ ca_Vx$_2(b)$) fof(ca_Vx2_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cp(a)) $\Rightarrow$ cp(b)) fof(cp_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cpxcomp(a)) $\Rightarrow$ cpxcomp(b)) fof(cpxcomp_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and ra_Px$_1(a, c)$) $\Rightarrow$ ra_Px$_1(b, c)$) fof(ra_Px1_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and ra_Px$_1(c, a)$) $\Rightarrow$ ra_Px$_1(c, b)$) fof(ra_Px1_substitution$_2$, axiom)
$\forall a, b, c$: (($a = b$ and rinvS(a, c)) $\Rightarrow$ rinvS(b, c)) fof(rinvS_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rinvS(c, a)) $\Rightarrow$ rinvS(c, b)) fof(rinvS_substitution$_2$, axiom)
$\forall a, b, c$: (($a = b$ and rr(a, c)) $\Rightarrow$ rr(b, c)) fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rr(c, a)) $\Rightarrow$ rr(c, b)) fof(rr_substitution$_2$, axiom)
$\forall a, b, c$: (($a = b$ and rs(a, c)) $\Rightarrow$ rs(b, c)) fof(rs_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rs(c, a)) $\Rightarrow$ rs(c, b)) fof(rs_substitution$_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ ($\forall y_0, y_1$: ((rr(x, y_0) and rr(x, y_1)) $\Rightarrow$ $y_0 = y_1$) and $\exists y$: (rr(x, y) and ca_Vx$_2(y)$) and $\exists y$: (rs(x, y)
$\forall x$: (cp(x) $\iff$ $\neg\exists y$: ra_Px$_1(x, y)$) fof(axiom$_3$, axiom)
$\forall x$: (cpxcomp(x) $\iff$ $\exists y_0$: ra_Px$_1(x, y_0)$) fof(axiom$_4$, axiom)
$\forall x$: (ca_Vx$_2(x)$ $\iff$ $\forall y$: (rinvS(x, y) $\Rightarrow$ cp(y))) fof(axiom$_5$, axiom)
$\forall x, y$: (rinvS(x, y) $\iff$ rs(y, x)) fof(axiom$_6$, axiom)
cUnsatisfiable(i2003_11_14_17_21$_{22376}$) fof(axiom$_7$, axiom)
$\forall x, y$: (rs(x, y) $\Rightarrow$ rr(x, y)) fof(axiom$_8$, axiom)

KRS116+1.p DL Test: t4.1 Dynamic blocking example
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\Rightarrow$ ca(x)) fof(axiom$_2$, axiom)
$\forall x$: (cUnsatisfiable(x) $\Rightarrow$ $\exists y$: (rs(x, y) and ca_Ax$_2(y)$)) fof(axiom$_3$, axiom)
$\forall x$: (ca(x) $\iff$ $\neg\exists y$: ra_Px$_1(x, y)$) fof(axiom$_4$, axiom)
$\forall x$: (caxcomp(x) $\iff$ $\exists y_0$: ra_Px$_1(x, y_0)$) fof(axiom$_5$, axiom)
$\forall x$: (cc(x) $\iff$ $\forall y$: (rinvR(x, y) $\Rightarrow$ ca_Vx$_7(y)$)) fof(axiom$_6$, axiom)
$\forall x$: (ca_Ax$_2(x)$ $\iff$ ($\forall y$: (rp(x, y) $\Rightarrow$ ca_Vx$_3(y)$) and $\forall y$: (rp(x, y) $\Rightarrow$ ca_Vx$_5(y)$) and $\forall y$: (rr(x, y) $\Rightarrow$ cc(y)) and $\exists y$: (rr(x, y) and cowlThing(y)) and $\exists y$: (rp(x, y) and cowlThing(y)) and $\forall y$: (rp(x, y) $\Rightarrow$ ca_Vx$_4(y)$))) fof(axi
$\forall x$: (ca_Vx$_3(x)$ $\iff$ $\exists y$: (rr(x, y) and cowlThing(y))) fof(axiom$_8$, axiom)
$\forall x$: (ca_Vx$_4(x)$ $\iff$ $\exists y$: (rp(x, y) and cowlThing(y))) fof(axiom$_9$, axiom)
$\forall x$: (ca_Vx$_5(x)$ $\iff$ $\forall y$: (rr(x, y) $\Rightarrow$ cc(y))) fof(axiom$_{10}$, axiom)
$\forall x$: (ca_Vx$_6(x)$ $\iff$ $\forall y$: (rinvS(x, y) $\Rightarrow$ caxcomp(y))) fof(axiom$_{11}$, axiom)
$\forall x$: (ca_Vx$_7(x)$ $\iff$ $\forall y$: (rinvP(x, y) $\Rightarrow$ ca_Vx$_6(y)$)) fof(axiom$_{12}$, axiom)
$\forall x, y$: (rinvP(x, y) $\iff$ rp(y, x)) fof(axiom$_{13}$, axiom)
$\forall x, y$: (rinvR(x, y) $\iff$ rr(y, x)) fof(axiom$_{14}$, axiom)
$\forall x, y$: (rinvS(x, y) $\iff$ rs(y, x)) fof(axiom$_{15}$, axiom)
$\forall x, y, z$: ((rp(x, y) and rp(y, z)) $\Rightarrow$ rp(x, z)) fof(axiom$_{16}$, axiom)
cUnsatisfiable(i2003_11_14_17_21$_{33997}$) fof(axiom$_{17}$, axiom)

KRS123+1.p DL Test: heinsohn1.1
Tbox tests from [HK+94]
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ (cc(x) and cd(x))) fof(axiom$_2$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ cdxcomp(x)) fof(axiom$_3$, axiom)

$\forall x$: (cc$_1(x)$ $\Rightarrow$ cd1xcomp(x)) fof(axiom$_4$, axiom)
$\forall x$: (cc$_1(x)$ $\Rightarrow$ cd$_1(x)$) fof(axiom$_5$, axiom)
$\forall x$: (cd(x) $\iff$ $\neg\exists y$: ra_Px$_1(x,y)$) fof(axiom$_6$, axiom)
$\forall x$: (cdxcomp(x) $\iff$ $\exists y_0$: ra_Px$_1(x,y_0)$) fof(axiom$_7$, axiom)
$\forall x$: (cd$_1(x)$ $\iff$ $\exists y_0$: ra_Px$_2(x,y_0)$) fof(axiom$_8$, axiom)
$\forall x$: (cd1xcomp(x) $\iff$ $\neg\exists y$: ra_Px$_2(x,y)$) fof(axiom$_9$, axiom)
$\forall x$: (ce$_3(x)$ $\Rightarrow$ cc(x)) fof(axiom$_{10}$, axiom)
$\forall x$: (cf(x) $\Rightarrow$ cd(x)) fof(axiom$_{11}$, axiom)
cUnsatisfiable(i2003_11_14_17_22$_{02803}$) fof(axiom$_{12}$, axiom)

KRS124+1.p DL Test: heinsohn1.2
Tbox tests from [HK+94]
$\forall x$: (cowlThing(x) and $\neg$cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ ($\exists y$: (rr(x,y) and cowlThing(y)) and $\forall y$: (rr(x,y) $\Rightarrow$ ca_Ax$_3(y)$))) fof(axiom$_2$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ cdxcomp(x)) fof(axiom$_3$, axiom)
$\forall x$: (cc$_1(x)$ $\Rightarrow$ cd$_1(x)$) fof(axiom$_4$, axiom)
$\forall x$: (cc$_1(x)$ $\Rightarrow$ cd1xcomp(x)) fof(axiom$_5$, axiom)
$\forall x$: (cd(x) $\iff$ $\neg\exists y$: ra_Px$_1(x,y)$) fof(axiom$_6$, axiom)
$\forall x$: (cdxcomp(x) $\iff$ $\exists y_0$: ra_Px$_1(x,y_0)$) fof(axiom$_7$, axiom)
$\forall x$: (cd$_1(x)$ $\iff$ $\exists y_0$: ra_Px$_2(x,y_0)$) fof(axiom$_8$, axiom)
$\forall x$: (cd1xcomp(x) $\iff$ $\neg\exists y$: ra_Px$_2(x,y)$) fof(axiom$_9$, axiom)
$\forall x$: (ce$_3(x)$ $\Rightarrow$ cc(x)) fof(axiom$_{10}$, axiom)
$\forall x$: (cf(x) $\Rightarrow$ cd(x)) fof(axiom$_{11}$, axiom)
$\forall x$: (ca_Ax$_3(x)$ $\iff$ (cd(x) and cc(x))) fof(axiom$_{12}$, axiom)
cUnsatisfiable(i2003_11_14_17_22$_{10903}$) fof(axiom$_{13}$, axiom)

KRS125+1.p DL Test: heinsohn1.3
Tbox tests from [HK+94]
$\forall x$: (cowlThing(x) and $\neg$cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\iff$ (ce$_3(x)$ and cf(x))) fof(axiom$_2$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ cdxcomp(x)) fof(axiom$_3$, axiom)
$\forall x$: (cc$_1(x)$ $\Rightarrow$ cd1xcomp(x)) fof(axiom$_4$, axiom)
$\forall x$: (cc$_1(x)$ $\Rightarrow$ cd$_1(x)$) fof(axiom$_5$, axiom)
$\forall x$: (cd(x) $\iff$ $\neg\exists y$: ra_Px$_1(x,y)$) fof(axiom$_6$, axiom)
$\forall x$: (cdxcomp(x) $\iff$ $\exists y_0$: ra_Px$_1(x,y_0)$) fof(axiom$_7$, axiom)
$\forall x$: (cd$_1(x)$ $\iff$ $\exists y_0$: ra_Px$_2(x,y_0)$) fof(axiom$_8$, axiom)
$\forall x$: (cd1xcomp(x) $\iff$ $\neg\exists y$: ra_Px$_2(x,y)$) fof(axiom$_9$, axiom)
$\forall x$: (ce$_3(x)$ $\Rightarrow$ cc(x)) fof(axiom$_{10}$, axiom)
$\forall x$: (cf(x) $\Rightarrow$ cd(x)) fof(axiom$_{11}$, axiom)
cUnsatisfiable(i2003_11_14_17_22$_{17947}$) fof(axiom$_{12}$, axiom)

KRS126+1.p DL Test: heinsohn1.4
Tbox tests from [HK+94]
$\forall x$: (cowlThing(x) and $\neg$cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable(x) $\Rightarrow$ cd1xcomp(x)) fof(axiom$_2$, axiom)
$\forall x$: (cUnsatisfiable(x) $\Rightarrow$ cd$_1(x)$) fof(axiom$_3$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ cdxcomp(x)) fof(axiom$_4$, axiom)
$\forall x$: (cd(x) $\iff$ $\neg\exists y$: ra_Px$_1(x,y)$) fof(axiom$_5$, axiom)
$\forall x$: (cdxcomp(x) $\iff$ $\exists y_0$: ra_Px$_1(x,y_0)$) fof(axiom$_6$, axiom)
$\forall x$: (cd$_1(x)$ $\iff$ $\exists y_0$: ra_Px$_2(x,y_0)$) fof(axiom$_7$, axiom)
$\forall x$: (cd1xcomp(x) $\iff$ $\neg\exists y$: ra_Px$_2(x,y)$) fof(axiom$_8$, axiom)
$\forall x$: (ce$_3(x)$ $\Rightarrow$ cc(x)) fof(axiom$_9$, axiom)
$\forall x$: (cf(x) $\Rightarrow$ cd(x)) fof(axiom$_{10}$, axiom)
cUnsatisfiable(i2003_11_14_17_22$_{23554}$) fof(axiom$_{11}$, axiom)

KRS127+1.p DL Test: heinsohn2.2
Tbox tests from [HK+94]
$\forall a, b$: (($a = b$ and cUnsatisfiable(a)) $\Rightarrow$ cUnsatisfiable(b)) fof(cUnsatisfiable_substitution$_1$, axiom)

$\forall a, b$: $((a = b$ and $\mathrm{cc}(a)) \Rightarrow \mathrm{cc}(b))$ fof(cc_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{cd}(a)) \Rightarrow \mathrm{cd}(b))$ fof(cd_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{cdxcomp}(a)) \Rightarrow \mathrm{cdxcomp}(b))$ fof(cdxcomp_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{cowlNothing}(a)) \Rightarrow \mathrm{cowlNothing}(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{cowlThing}(a)) \Rightarrow \mathrm{cowlThing}(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\mathrm{ra\_Px}_1(a, c)) \Rightarrow \mathrm{ra\_Px}_1(b, c))$ fof(ra_Px1_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\mathrm{ra\_Px}_1(c, a)) \Rightarrow \mathrm{ra\_Px}_1(c, b))$ fof(ra_Px1_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and $\mathrm{rr}(a, c)) \Rightarrow \mathrm{rr}(b, c))$ fof(rr_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\mathrm{rr}(c, a)) \Rightarrow \mathrm{rr}(c, b))$ fof(rr_substitution$_2$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{xsd\_integer}(a)) \Rightarrow \mathrm{xsd\_integer}(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{xsd\_string}(a)) \Rightarrow \mathrm{xsd\_string}(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: $(\mathrm{xsd\_string}(x) \iff \neg\, \mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable$(x) \iff (\exists y$: (rr(x, y) and cc(y)) and $\exists y$: (rr(x, y) and cd(y)) and $\forall y_0, y_1$: ((rr(x, y_0) and rr(x, y_1)) $\Rightarrow$ $y_0 = y_1$))) fof(axiom$_2$, axiom)
$\forall x$: $(\mathrm{cc}(x) \Rightarrow \mathrm{cdxcomp}(x))$ fof(axiom$_3$, axiom)
$\forall x$: $(\mathrm{cd}(x) \iff \neg\, \exists y\colon \mathrm{ra\_Px}_1(x, y))$ fof(axiom$_4$, axiom)
$\forall x$: $(\mathrm{cdxcomp}(x) \iff \exists y_0\colon \mathrm{ra\_Px}_1(x, y_0))$ fof(axiom$_5$, axiom)
cUnsatisfiable(i2003_11_14_17_22$_{27794}$) fof(axiom$_6$, axiom)

KRS128+1.p DL Test: heinsohn4.1
Tbox tests from [HK+94]
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: $(\mathrm{xsd\_string}(x) \iff \neg\, \mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x$: (cUnsatisfiable$(x) \iff (\exists y$: (rr(x, y) and cexcomp(y)) and $\forall y$: (rr$(x, y) \Rightarrow$ cd(y)) and $\forall y$: (rr$(x, y) \Rightarrow$ ca_Cx$_4(y)$))) fof(axiom$_2$, axiom)
$\forall x$: $(\mathrm{cc}(x) \Rightarrow \mathrm{cdxcomp}(x))$ fof(axiom$_3$, axiom)
$\forall x$: $(\mathrm{cd}(x) \iff \exists y_0\colon \mathrm{ra\_Px}_2(x, y_0))$ fof(axiom$_4$, axiom)
$\forall x$: $(\mathrm{cdxcomp}(x) \iff \neg\, \exists y\colon \mathrm{ra\_Px}_2(x, y))$ fof(axiom$_5$, axiom)
$\forall x$: $(\mathrm{ce}(x) \iff \neg\, \exists y\colon \mathrm{ra\_Px}_1(x, y))$ fof(axiom$_6$, axiom)
$\forall x$: $(\mathrm{cexcomp}(x) \iff \exists y_0\colon \mathrm{ra\_Px}_1(x, y_0))$ fof(axiom$_7$, axiom)
$\forall x$: $(\mathrm{ca\_Cx}_4(x) \iff \exists y_0\colon \mathrm{ra\_Px}_4(x, y_0))$ fof(axiom$_8$, axiom)
$\forall x$: $(\mathrm{ca\_Cx4xcomp}(x) \iff \neg\, \exists y\colon \mathrm{ra\_Px}_4(x, y))$ fof(axiom$_9$, axiom)
$\forall x$: (ca_Cx4xcomp$(x) \iff$ (cd(x) and cexcomp(x))) fof(axiom$_{10}$, axiom)
cUnsatisfiable(i2003_11_14_17_22$_{31584}$) fof(axiom$_{11}$, axiom)

KRS129+1.p An example combinging owl:oneOf and owl:inverseOf
$\forall a, b$: $((a = b$ and $\mathrm{cEUCountry}(a)) \Rightarrow \mathrm{cEUCountry}(b))$ fof(cEUCountry_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{cEuroMP}(a)) \Rightarrow \mathrm{cEuroMP}(b))$ fof(cEuroMP_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{cEuropeanCountry}(a)) \Rightarrow \mathrm{cEuropeanCountry}(b))$ fof(cEuropeanCountry_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{cPerson}(a)) \Rightarrow \mathrm{cPerson}(b))$ fof(cPerson_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{cowlNothing}(a)) \Rightarrow \mathrm{cowlNothing}(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{cowlThing}(a)) \Rightarrow \mathrm{cowlThing}(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\mathrm{rhasEuroMP}(a, c)) \Rightarrow \mathrm{rhasEuroMP}(b, c))$ fof(rhasEuroMP_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\mathrm{rhasEuroMP}(c, a)) \Rightarrow \mathrm{rhasEuroMP}(c, b))$ fof(rhasEuroMP_substitution$_2$, axiom)
$\forall a, b, c$: $((a = b$ and $\mathrm{risEuroMPFrom}(a, c)) \Rightarrow \mathrm{risEuroMPFrom}(b, c))$ fof(risEuroMPFrom_substitution$_1$, axiom)
$\forall a, b, c$: $((a = b$ and $\mathrm{risEuroMPFrom}(c, a)) \Rightarrow \mathrm{risEuroMPFrom}(c, b))$ fof(risEuroMPFrom_substitution$_2$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{xsd\_integer}(a)) \Rightarrow \mathrm{xsd\_integer}(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: $((a = b$ and $\mathrm{xsd\_string}(a)) \Rightarrow \mathrm{xsd\_string}(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: $(\mathrm{xsd\_string}(x) \iff \neg\, \mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x$: (cEUCountry$(x) \iff (x = \mathrm{iBE}$ or $x = \mathrm{iFR}$ or $x = \mathrm{iES}$ or $x = \mathrm{iUK}$ or $x = \mathrm{iNL}$ or $x = \mathrm{iPT}$)) fof(axiom$_2$, axiom)
$\forall x$: (cEuroMP$(x) \iff \exists y$: (risEuroMPFrom(x, y) and cowlThing(y)))) fof(axiom$_3$, axiom)
$\forall x, y$: $(\mathrm{rhasEuroMP}(x, y) \Rightarrow \mathrm{cEUCountry}(x))$ fof(axiom$_4$, axiom)
$\forall x, y$: $(\mathrm{risEuroMPFrom}(x, y) \iff \mathrm{rhasEuroMP}(y, x))$ fof(axiom$_5$, axiom)
cEuropeanCountry(iBE) fof(axiom$_6$, axiom)
cEuropeanCountry(iES) fof(axiom$_7$, axiom)
cEuropeanCountry(iFR) fof(axiom$_8$, axiom)
cPerson(iKinnock) fof(axiom$_9$, axiom)
cEuropeanCountry(iNL) fof(axiom$_{10}$, axiom)

cEuropeanCountry(iPT)   fof(axiom$_{11}$, axiom)
cEuropeanCountry(iUK)   fof(axiom$_{12}$, axiom)
rhasEuroMP(iUK, iKinnock)   fof(axiom$_{13}$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and cEuroMP(iKinnock)   fof(th

KRS130+1.p owl:Nothing can be defined using OWL Lite restrictions
A class like owl:Nothing can be defined using OWL Lite restrictions.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x))   fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x$: (cNothing(x) $\Rightarrow$ $\neg \exists y$: rp(x, y))   fof(axiom$_2$, axiom)
$\forall x$: (cNothing(x) $\Rightarrow$ $\exists y_0$: rp(x, y_0))   fof(axiom$_3$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x$: (cNothing(x) $\iff$ cowlNothing(x))   fof(the_axiom, conjecture)

KRS131+1.p The complement of a class can be defined
The complement of a class can be defined using OWL Lite restrictions.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x))   fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x$: (cA(x) $\iff$ $\exists y$: (rq(x, y) and cowlThing(y)))   fof(axiom$_2$, axiom)
$\forall x$: (cNothing(x) $\Rightarrow$ $\neg \exists y$: rp(x, y))   fof(axiom$_3$, axiom)
$\forall x$: (cNothing(x) $\Rightarrow$ $\exists y_0$: rp(x, y_0))   fof(axiom$_4$, axiom)
$\forall x$: (cnotA(x) $\iff$ $\forall y$: (rq(x, y) $\Rightarrow$ cNothing(y)))   fof(axiom$_5$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x$: (cnotA(x) $\iff$ $\neg$ cA(x))   fof(the_axiom, conjecture)

KRS132+1.p The union of two classes can be defined
The union of two classes can be defined using OWL Lite restrictions, and owl:intersectionOf.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x))   fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x$: (cA(x) $\iff$ $\exists y$: (rq(x, y) and cowlThing(y)))   fof(axiom$_2$, axiom)
$\forall x$: (cAorB(x) $\iff$ $\exists y$: (rs(x, y) and cowlThing(y)))   fof(axiom$_3$, axiom)
$\forall x$: (cB(x) $\iff$ $\exists y$: (rr(x, y) and cowlThing(y)))   fof(axiom$_4$, axiom)
$\forall x$: (cNothing(x) $\Rightarrow$ $\exists y_0$: rp(x, y_0))   fof(axiom$_5$, axiom)
$\forall x$: (cNothing(x) $\Rightarrow$ $\neg \exists y$: rp(x, y))   fof(axiom$_6$, axiom)
$\forall x$: (cnotA(x) $\iff$ $\forall y$: (rq(x, y) $\Rightarrow$ cNothing(y)))   fof(axiom$_7$, axiom)
$\forall x$: (cnotAorB(x) $\iff$ $\forall y$: (rs(x, y) $\Rightarrow$ cNothing(y)))   fof(axiom$_8$, axiom)
$\forall x$: (cnotAorB(x) $\iff$ (cnotB(x) and cnotA(x)))   fof(axiom$_9$, axiom)
$\forall x$: (cnotB(x) $\iff$ $\forall y$: (rr(x, y) $\Rightarrow$ cNothing(y)))   fof(axiom$_{10}$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x$: (cAorB(x) $\iff$ (cB(x) or cA(x)))   fof(the_axiom, conjecture)

KRS134+1.p This is a typical definition of range from description logic
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x))   fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x, y$: (rprop(x, y) $\Rightarrow$ cA(y))   fof(axiom$_2$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x$: (cowlThing(x) $\Rightarrow$ $\forall y$: (rprop(x, y) $\Rightarrow$ cA(y)))   fof(the_axiom, conjecture)

KRS135+1.p This is a typical definition of range from description logic
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x))   fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x$: (cowlThing(x) $\Rightarrow$ $\forall y$: (rprop(x, y) $\Rightarrow$ cA(y)))   fof(axiom$_2$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x, y$: (rprop(x, y) $\Rightarrow$ cA(y))   fof(the_axiom, conjecture)

KRS136+1.p Some set theory
The abstract syntax form of the conclusions is: EquivalentClasses(restriction(first:p,minCardinality(1))) ObjectProperty(first:p). This is trivially true given that first:p is an individualvaluedPropertyID.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x))   fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(the_axiom, conjecture)

KRS137+1.p A variation of equivalentClass-001

This is a variation of equivalentClass-001, showing the use of owl:Ontology triples in the premises and conclusions.
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom_0, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom_1, axiom)
$\forall x$: (cCar(x) $\iff$ cAutomobile(x)) fof(axiom_2, axiom)
cowlThing(iauto) fof(axiom_3, axiom)
cAutomobile(iauto) fof(axiom_4, axiom)
cowlThing(icar) fof(axiom_5, axiom)
cCar(icar) fof(axiom_6, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and cCar(iauto) and cowlThing(iau

KRS138+1.p Extensional semantics of owl:SymmetricProperty
Test illustrating extensional semantics of owl:SymmetricProperty.
$\forall a, b$: (($a = b$ and cA(a)) $\Rightarrow$ cA(b)) fof(cA_substitution_1, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof($\text{cowlNothing\_substitution}_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof($\text{cowlThing\_substitution}_1$, axiom)
$\forall a, b, c$: (($a = b$ and requalityOnA(a, c)) $\Rightarrow$ requalityOnA(b, c)) fof($\text{requalityOnA\_substitution}_1$, axiom)
$\forall a, b, c$: (($a = b$ and requalityOnA(c, a)) $\Rightarrow$ requalityOnA(c, b)) fof($\text{requalityOnA\_substitution}_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof($\text{xsd\_integer\_substitution}_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof($\text{xsd\_string\_substitution}_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom_0, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom_1, axiom)
$\forall x$: (cA(x) $\iff$ (x = ib or x = ia)) fof(axiom_2, axiom)
$\forall x, y, z$: ((requalityOnA(y, x) and requalityOnA(z, x)) $\Rightarrow$ $y = z$) fof(axiom_3, axiom)
$\forall x, y$: (requalityOnA(x, y) $\Rightarrow$ cA(y)) fof(axiom_4, axiom)
cowlThing(ia) fof(axiom_5, axiom)
requalityOnA(ia, ia) fof(axiom_6, axiom)
cowlThing(ib) fof(axiom_7, axiom)
requalityOnA(ib, ib) fof(axiom_8, axiom)
cowlThing(ic) fof(axiom_9, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x, y$: (requalityOnA(x, y) $\Rightarrow$
(x = ia or x = ib or x = ic)) and $\forall x, y$: (requalityOnA(x, y) $\Rightarrow$ requalityOnA(y, x)) and cowlThing(ia) and requalityOnA(ia

KRS139+1.p A Lite version of test SymmetricProperty-001
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom_0, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom_1, axiom)
$\forall x, y$: (rpath(x, y) $\Rightarrow$ rpath(y, x)) fof(axiom_2, axiom)
cowlThing(iAntwerp) fof(axiom_3, axiom)
cowlThing(iGhent) fof(axiom_4, axiom)
rpath(iGhent, iAntwerp) fof(axiom_5, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and cowlThing(iAntwerp) and rpat

KRS140+1.p Test illustrating extensional semantics of owl:TransitiveProperty
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof($\text{cowlNothing\_substitution}_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof($\text{cowlThing\_substitution}_1$, axiom)
$\forall a, b, c$: (($a = b$ and rsymProp(a, c)) $\Rightarrow$ rsymProp(b, c)) fof($\text{rsymProp\_substitution}_1$, axiom)
$\forall a, b, c$: (($a = b$ and rsymProp(c, a)) $\Rightarrow$ rsymProp(c, b)) fof($\text{rsymProp\_substitution}_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof($\text{xsd\_integer\_substitution}_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof($\text{xsd\_string\_substitution}_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom_0, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom_1, axiom)
$\forall x, y$: (rsymProp(x, y) $\Rightarrow$ (y = ia or y = ib)) fof(axiom_2, axiom)
$\forall x, y$: (rsymProp(x, y) $\Rightarrow$ rsymProp(y, x)) fof(axiom_3, axiom)
cowlThing(ia) fof(axiom_4, axiom)
rsymProp(ia, ia) fof(axiom_5, axiom)
cowlThing(ib) fof(axiom_6, axiom)
rsymProp(ib, ib) fof(axiom_7, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x, y, z$: ((rsymProp(x, y) and r
rsymProp(x, z)) and $\exists x$: (rsymProp(ia, x) and cowlThing(x)) fof(the_axiom, conjecture)

KRS141+1.p A simple example
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom_0, axiom)

$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x$: (cr(x) $\Rightarrow$ $\forall y$: (rp(x, y) $\Rightarrow$ cc(y)))   fof(axiom$_2$, axiom)
cr(ii)   fof(axiom$_3$, axiom)
cowlThing(ii)   fof(axiom$_4$, axiom)
rp(ii, io)   fof(axiom$_5$, axiom)
cowlThing(io)   fof(axiom$_6$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and cc(io) and cowlThing(io)   fo

KRS142+1.p An owl:cardinality constraint is simply shorthand
An owl:cardinality constraint is simply shorthand for a pair of owl:minCardinality and owl:maxCardinality constraints.
$\forall a, b$: (($a = b$ and cc(a)) $\Rightarrow$ cc(b))   fof(cc_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b))   fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b))   fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rp(a, c)) $\Rightarrow$ rp(b, c))   fof(rp_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rp(c, a)) $\Rightarrow$ rp(c, b))   fof(rp_substitution$_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b))   fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b))   fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x))   fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ ($\exists y_0$: rp(x, y_0) and $\forall y_0, y_1$: ((rp(x, y_0) and rp(x, y_1)) $\Rightarrow$ $y_0 = y_1$)))   fof(axiom$_2$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x$: (cc(x) $\Rightarrow$ $\exists y_0$: rp(x, y_0)) a
$\forall y_0, y_1$: ((rp(x, y_0) and rp(x, y_1)) $\Rightarrow$ $y_0 = y_1$))   fof(the_axiom, conjecture)

KRS143+1.p An owl:cardinality constraint is simply shorthand
An owl:cardinality constraint is simply shorthand for a pair of owl:minCardinality and owl:maxCardinality constraints.
$\forall a, b$: (($a = b$ and cc(a)) $\Rightarrow$ cc(b))   fof(cc_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b))   fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b))   fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rp(a, c)) $\Rightarrow$ rp(b, c))   fof(rp_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rp(c, a)) $\Rightarrow$ rp(c, b))   fof(rp_substitution$_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b))   fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b))   fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x))   fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ $\exists y_0$: rp(x, y_0))   fof(axiom$_2$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ $\forall y_0, y_1$: ((rp(x, y_0) and rp(x, y_1)) $\Rightarrow$ $y_0 = y_1$))   fof(axiom$_3$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x$: (cc(x) $\Rightarrow$ ($\exists y_0$: rp(x, y_0) a
$y_0 = y_1$)))   fof(the_axiom, conjecture)

KRS144+1.p An owl:cardinality constraint is simply shorthand
An owl:cardinality constraint is simply shorthand for a pair of owl:minCardinality and owl:maxCardinality constraints.
$\forall a, b$: (($a = b$ and cc(a)) $\Rightarrow$ cc(b))   fof(cc_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b))   fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b))   fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rp(a, c)) $\Rightarrow$ rp(b, c))   fof(rp_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rp(c, a)) $\Rightarrow$ rp(c, b))   fof(rp_substitution$_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b))   fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b))   fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x))   fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ ($\exists y_0, y_1$: (rp(x, y_0) and rp(x, y_1) and $y_0 \neq y_1$) and $\forall y_0, y_1, y_2$: ((rp(x, y_0) and rp(x, y_1) and rp(x, y_2)) $\Rightarrow$
($y_0 = y_1$ or $y_0 = y_2$ or $y_1 = y_2$))))   fof(axiom$_2$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x$: (cc(x) $\Rightarrow$ $\forall y_0, y_1, y_2$: ((rp(
($y_0 = y_1$ or $y_0 = y_2$ or $y_1 = y_2$))) and $\forall x$: (cc(x) $\Rightarrow$ $\exists y_0, y_1$: (rp(x, y_0) and rp(x, y_1) and $y_0 \neq y_1$))   fof(the_axiom, conjectu

KRS145+1.p An owl:cardinality constraint is simply shorthand
An owl:cardinality constraint is simply shorthand for a pair of owl:minCardinality and owl:maxCardinality constraints.

$\forall a, b$: (($a = b$ and cc(a)) $\Rightarrow$ cc(b))   fof(cc_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b))   fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b))   fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rp(a, c)) $\Rightarrow$ rp(b, c))   fof(rp_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rp(c, a)) $\Rightarrow$ rp(c, b))   fof(rp_substitution$_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b))   fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b))   fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x))   fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x$: (cc(x) $\Rightarrow$ ($\forall y_0, y_1, y_2$: ((rp(x, y_0) and rp(x, y_1) and rp(x, y_2)) $\Rightarrow$ ($y_0 = y_1$ or $y_0 = y_2$ or $y_1 = y_2$)) and $\exists y_0, y_1$: (rp(x, y_0)
y_1)))   fof(axiom$_2$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x$: (cc(x) $\Rightarrow$ ($\exists y_0, y_1$: (rp(x, y
y_1) and $\forall y_0, y_1, y_2$: ((rp(x, y_0) and rp(x, y_1) and rp(x, y_2)) $\Rightarrow$ ($y_0 = y_1$ or $y_0 = y_2$ or $y_1 = y_2$))))   fof(the_axiom, conjectur

KRS150+1.p DL Test: k_lin ABox test from DL98 systems comparison
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x))   fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x$: (cC$_{10}$(x) $\iff$ $\exists y$: (rR$_1$(x, y) and $\neg$ cC$_2$(y)))   fof(axiom$_2$, axiom)
$\forall x$: (cC$_{12}$(x) $\iff$ ($\neg$ cC$_2$(x) and $\neg$ cC$_{10}$(x)))   fof(axiom$_3$, axiom)
$\forall x$: (cC$_{14}$(x) $\iff$ $\exists y$: (rR$_1$(x, y) and cC$_{12}$(y)))   fof(axiom$_4$, axiom)
$\forall x$: (cC$_{16}$(x) $\iff$ (cC$_{14}$(x) and cC$_8$(x)))   fof(axiom$_5$, axiom)
$\forall x$: (cC$_{18}$(x) $\iff$ (cTOP(x) and cC$_{16}$(x)))   fof(axiom$_6$, axiom)
$\forall x$: (cC$_4$(x) $\iff$ $\exists y$: (rR$_1$(x, y) and $\neg$ cC$_2$(y)))   fof(axiom$_7$, axiom)
$\forall x$: (cC$_6$(x) $\iff$ ($\neg$ cC$_2$(x) and $\neg$ cC$_4$(x)))   fof(axiom$_8$, axiom)
$\forall x$: (cC$_8$(x) $\iff$ $\exists y$: (rR$_1$(x, y) and cC$_6$(y)))   fof(axiom$_9$, axiom)
$\forall x$: (cTEST(x) $\iff$ (cC$_{18}$(x) and cTOP(x)))   fof(axiom$_{10}$, axiom)
cTOP(iV$_{16560}$)   fof(axiom$_{11}$, axiom)
cTEST(iV$_{16560}$)   fof(axiom$_{12}$, axiom)
cowlThing(iV$_{16560}$)   fof(axiom$_{13}$, axiom)
rR$_1$(iV$_{16560}$, iV$_{16562}$)   fof(axiom$_{14}$, axiom)
rR$_1$(iV$_{16560}$, iV$_{16561}$)   fof(axiom$_{15}$, axiom)
$\neg$ cC$_4$(iV$_{16561}$)   fof(axiom$_{16}$, axiom)
cowlThing(iV$_{16561}$)   fof(axiom$_{17}$, axiom)
$\forall x$: (rR$_1$(iV$_{16561}$, x) $\Rightarrow$ cC$_2$(x))   fof(axiom$_{18}$, axiom)
$\neg$ cC$_2$(iV$_{16561}$)   fof(axiom$_{19}$, axiom)
$\neg$ cC$_{10}$(iV$_{16562}$)   fof(axiom$_{20}$, axiom)
$\neg$ cC$_2$(iV$_{16562}$)   fof(axiom$_{21}$, axiom)
cowlThing(iV$_{16562}$)   fof(axiom$_{22}$, axiom)
$\forall x$: (rR$_1$(iV$_{16562}$, x) $\Rightarrow$ cC$_2$(x))   fof(axiom$_{23}$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and cC$_{18}$(iV$_{16560}$) and cC$_{16}$(iV$_{1656}$

KRS152+1.p DL Test: k_ph ABox test from DL98 systems comparison
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x))   fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x))   fof(axiom$_1$, axiom)
$\forall x$: (cC$_{10}$(x) $\iff$ (cC$_2$(x) and cC$_4$(x)))   fof(axiom$_2$, axiom)
$\forall x$: (cC$_{12}$(x) $\iff$ $\exists y$: (rR$_1$(x, y) and cC$_{10}$(y)))   fof(axiom$_3$, axiom)
$\forall x$: (cC$_6$(x) $\iff$ ($\neg$ cC$_2$(x) and cC$_4$(x)))   fof(axiom$_4$, axiom)
$\forall x$: (cC$_8$(x) $\iff$ $\exists y$: (rR$_1$(x, y) and cC$_6$(y)))   fof(axiom$_5$, axiom)
$\forall x$: (cTEST(x) $\iff$ (cC$_{12}$(x) and $\neg$ cC$_8$(x)))   fof(axiom$_6$, axiom)
cTEST(iV$_{21080}$)   fof(axiom$_7$, axiom)
cowlThing(iV$_{21080}$)   fof(axiom$_8$, axiom)
$\forall x$: (rR$_1$(iV$_{21080}$, x) $\Rightarrow$ $\neg$ cC$_6$(x))   fof(axiom$_9$, axiom)
$\neg$ cC$_8$(iV$_{21080}$)   fof(axiom$_{10}$, axiom)
rR$_1$(iV$_{21080}$, iV$_{21081}$)   fof(axiom$_{11}$, axiom)
$\neg$ cC$_6$(iV$_{21081}$)   fof(axiom$_{12}$, axiom)
cowlThing(iV$_{21081}$)   fof(axiom$_{13}$, axiom)
cC$_2$(iV$_{21081}$)   fof(axiom$_{14}$, axiom)
cC$_4$(iV$_{21081}$)   fof(axiom$_{15}$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and cowlThing(iV$_{21080}$) and cC$_{12}$(i

KRS160+1.p DL Test: k_ph ABox test from DL98 systems comparison

$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg\,\mathrm{cowlNothing}(x))$ fof(axiom$_0$, axiom)
$\forall x\colon (\mathrm{xsd\_string}(x) \iff \neg\,\mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x\colon (\mathrm{cC}_{10}(x) \iff (\mathrm{cC}_4(x) \text{ and } \mathrm{cC}_2(x)))$ fof(axiom$_2$, axiom)
$\forall x\colon (\mathrm{cC}_{12}(x) \iff \exists y\colon (\mathrm{rR}_1(x,y) \text{ and } \mathrm{cC}_{10}(y)))$ fof(axiom$_3$, axiom)
$\forall x\colon (\mathrm{cC}_2(x) \iff \neg\,\exists y\colon \mathrm{ra\_Px}_1(x,y))$ fof(axiom$_4$, axiom)
$\forall x\colon (\mathrm{cC2xcomp}(x) \iff \exists y_0\colon \mathrm{ra\_Px}_1(x,y_0))$ fof(axiom$_5$, axiom)
$\forall x\colon (\mathrm{cC}_6(x) \iff (\mathrm{cC2xcomp}(x) \text{ and } \mathrm{cC}_4(x)))$ fof(axiom$_6$, axiom)
$\forall x\colon (\mathrm{cC}_6(x) \iff \neg\,\exists y\colon \mathrm{ra\_Px}_4(x,y))$ fof(axiom$_7$, axiom)
$\forall x\colon (\mathrm{cC6xcomp}(x) \iff \exists y_0\colon \mathrm{ra\_Px}_4(x,y_0))$ fof(axiom$_8$, axiom)
$\forall x\colon (\mathrm{cC}_8(x) \iff \exists y_0\colon \mathrm{ra\_Px}_2(x,y_0))$ fof(axiom$_9$, axiom)
$\forall x\colon (\mathrm{cC}_8(x) \iff \exists y\colon (\mathrm{rR}_1(x,y) \text{ and } \mathrm{cC}_6(y)))$ fof(axiom$_{10}$, axiom)
$\forall x\colon (\mathrm{cC8xcomp}(x) \iff \neg\,\exists y\colon \mathrm{ra\_Px}_2(x,y))$ fof(axiom$_{11}$, axiom)
$\forall x\colon (\mathrm{cTEST}(x) \iff (\mathrm{cC8xcomp}(x) \text{ and } \mathrm{cC}_{12}(x)))$ fof(axiom$_{12}$, axiom)
$\mathrm{cTEST}(\mathrm{iV}_{21080})$ fof(axiom$_{13}$, axiom)
$\mathrm{cC8xcomp}(\mathrm{iV}_{21080})$ fof(axiom$_{14}$, axiom)
$\mathrm{cowlThing}(\mathrm{iV}_{21080})$ fof(axiom$_{15}$, axiom)
$\forall x\colon (\mathrm{rR}_1(\mathrm{iV}_{21080},x) \Rightarrow \mathrm{cC6xcomp}(x))$ fof(axiom$_{16}$, axiom)
$\mathrm{rR}_1(\mathrm{iV}_{21080},\mathrm{iV}_{21081})$ fof(axiom$_{17}$, axiom)
$\mathrm{cC}_4(\mathrm{iV}_{21081})$ fof(axiom$_{18}$, axiom)
$\mathrm{cC6xcomp}(\mathrm{iV}_{21081})$ fof(axiom$_{19}$, axiom)
$\mathrm{cC}_2(\mathrm{iV}_{21081})$ fof(axiom$_{20}$, axiom)
$\mathrm{cowlThing}(\mathrm{iV}_{21081})$ fof(axiom$_{21}$, axiom)
$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg\,\mathrm{cowlNothing}(x)) \text{ and } \forall x\colon (\mathrm{xsd_string}(x) \iff \neg\,\mathrm{xsd_integer}(x)) \text{ and } \mathrm{cowlThing}(\mathrm{iV}_{21080}) \text{ and } \mathrm{cC}_{12}($i

KRS162+1.p Entailment for three natural numbers
This entailment can be replicated for any three natural numbers i, j, k such that i+j >= k. In this example, they are chosen as 2, 3 and 5.
$\forall a,b\colon ((a = b \text{ and } \mathrm{cA}(a)) \Rightarrow \mathrm{cA}(b))$ fof(cA_substitution$_1$, axiom)
$\forall a,b\colon ((a = b \text{ and } \mathrm{cB}(a)) \Rightarrow \mathrm{cB}(b))$ fof(cB_substitution$_1$, axiom)
$\forall a,b\colon ((a = b \text{ and } \mathrm{cowlNothing}(a)) \Rightarrow \mathrm{cowlNothing}(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a,b\colon ((a = b \text{ and } \mathrm{cowlThing}(a)) \Rightarrow \mathrm{cowlThing}(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a,b,c\colon ((a = b \text{ and } \mathrm{rp}(a,c)) \Rightarrow \mathrm{rp}(b,c))$ fof(rp_substitution$_1$, axiom)
$\forall a,b,c\colon ((a = b \text{ and } \mathrm{rp}(c,a)) \Rightarrow \mathrm{rp}(c,b))$ fof(rp_substitution$_2$, axiom)
$\forall a,b,c\colon ((a = b \text{ and } \mathrm{rq}(a,c)) \Rightarrow \mathrm{rq}(b,c))$ fof(rq_substitution$_1$, axiom)
$\forall a,b,c\colon ((a = b \text{ and } \mathrm{rq}(c,a)) \Rightarrow \mathrm{rq}(c,b))$ fof(rq_substitution$_2$, axiom)
$\forall a,b,c\colon ((a = b \text{ and } \mathrm{rr}(a,c)) \Rightarrow \mathrm{rr}(b,c))$ fof(rr_substitution$_1$, axiom)
$\forall a,b,c\colon ((a = b \text{ and } \mathrm{rr}(c,a)) \Rightarrow \mathrm{rr}(c,b))$ fof(rr_substitution$_2$, axiom)
$\forall a,b\colon ((a = b \text{ and } \mathrm{xsd\_integer}(a)) \Rightarrow \mathrm{xsd\_integer}(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a,b\colon ((a = b \text{ and } \mathrm{xsd\_string}(a)) \Rightarrow \mathrm{xsd\_string}(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg\,\mathrm{cowlNothing}(x))$ fof(axiom$_0$, axiom)
$\forall x\colon (\mathrm{xsd\_string}(x) \iff \neg\,\mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)
$\forall x,y\colon (\mathrm{rp}(x,y) \Rightarrow \mathrm{cA}(y))$ fof(axiom$_2$, axiom)
$\forall x,y\colon (\mathrm{rq}(x,y) \Rightarrow \mathrm{cB}(y))$ fof(axiom$_3$, axiom)
$\forall x\colon \neg\,\mathrm{cB}(x) \text{ and } \mathrm{cA}(x)$ fof(axiom$_4$, axiom)
$\forall x,y\colon (\mathrm{rq}(x,y) \Rightarrow \mathrm{rr}(x,y))$ fof(axiom$_5$, axiom)
$\forall x,y\colon (\mathrm{rp}(x,y) \Rightarrow \mathrm{rr}(x,y))$ fof(axiom$_6$, axiom)
$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg\,\mathrm{cowlNothing}(x)) \text{ and } \forall x\colon (\mathrm{xsd\_string}(x) \iff \neg\,\mathrm{xsd\_integer}(x)) \text{ and } \forall x\colon ((\exists y_0,y_1\colon (\mathrm{rp}(x,y_0) \text{ and } \mathrm{rp}($
$y_1) \text{ and } \exists y_0,y_1,y_2\colon (\mathrm{rq}(x,y_0) \text{ and } \mathrm{rq}(x,y_1) \text{ and } \mathrm{rq}(x,y_2) \text{ and } y_0 \neq y_1 \text{ and } y_0 \neq y_2 \text{ and } y_1 \neq y_2)) \Rightarrow \exists y_0,y_1,y_2,y_3,y_4\colon (\mathrm{rr}(x,y$
$y_1 \text{ and } y_0 \neq y_2 \text{ and } y_0 \neq y_3 \text{ and } y_0 \neq y_4 \text{ and } y_1 \neq y_2 \text{ and } y_1 \neq y_3 \text{ and } y_1 \neq y_4 \text{ and } y_2 \neq y_3 \text{ and } y_2 \neq y_4 \text{ and } y_3 \neq$
$y_4))$ fof(the_axiom, conjecture)

KRS163+1.p Disjoint classes have different members
$\forall a,b\colon ((a = b \text{ and } \mathrm{cA}(a)) \Rightarrow \mathrm{cA}(b))$ fof(cA_substitution$_1$, axiom)
$\forall a,b\colon ((a = b \text{ and } \mathrm{cB}(a)) \Rightarrow \mathrm{cB}(b))$ fof(cB_substitution$_1$, axiom)
$\forall a,b\colon ((a = b \text{ and } \mathrm{cowlNothing}(a)) \Rightarrow \mathrm{cowlNothing}(b))$ fof(cowlNothing_substitution$_1$, axiom)
$\forall a,b\colon ((a = b \text{ and } \mathrm{cowlThing}(a)) \Rightarrow \mathrm{cowlThing}(b))$ fof(cowlThing_substitution$_1$, axiom)
$\forall a,b\colon ((a = b \text{ and } \mathrm{xsd\_integer}(a)) \Rightarrow \mathrm{xsd\_integer}(b))$ fof(xsd_integer_substitution$_1$, axiom)
$\forall a,b\colon ((a = b \text{ and } \mathrm{xsd\_string}(a)) \Rightarrow \mathrm{xsd\_string}(b))$ fof(xsd_string_substitution$_1$, axiom)
$\forall x\colon (\mathrm{cowlThing}(x) \text{ and } \neg\,\mathrm{cowlNothing}(x))$ fof(axiom$_0$, axiom)
$\forall x\colon (\mathrm{xsd\_string}(x) \iff \neg\,\mathrm{xsd\_integer}(x))$ fof(axiom$_1$, axiom)

cA(ia) fof(axiom$_2$, axiom)
cowlThing(ia) fof(axiom$_3$, axiom)
cB(ib) fof(axiom$_4$, axiom)
cowlThing(ib) fof(axiom$_5$, axiom)
$\forall x$: $\neg$ cB(x) and cA(x) fof(axiom$_6$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and cowlThing(ia) and cowlThing(
ib fof(the_axiom, conjecture)

KRS164+1.p Two classes may have the same class extension
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cCar(x) $\iff$ cAutomobile(x)) fof(axiom$_2$, axiom)
cAutomobile(iauto) fof(axiom$_3$, axiom)
cowlThing(iauto) fof(axiom$_4$, axiom)
cCar(icar) fof(axiom$_5$, axiom)
cowlThing(icar) fof(axiom$_6$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and cCar(iauto) and cowlThing(iau

KRS165+1.p Two classes may be different names for the same set of individuals
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cCar(x) $\iff$ cAutomobile(x)) fof(axiom$_2$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x$: (cAutomobile(x) $\Rightarrow$ cCar(x)) and $\forall x$: (cCar(x) $\Rightarrow$ cAutomobile(x)) fof(the_axiom, conjecture)

KRS166+1.p Two classes may be different names for the same set of individuals
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cAutomobile(x) $\Rightarrow$ cCar(x)) fof(axiom$_2$, axiom)
$\forall x$: (cCar(x) $\Rightarrow$ cAutomobile(x)) fof(axiom$_3$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x$: (cCar(x) $\iff$ cAutomobile(x)) fof(the_axiom, conjecture)

KRS167+1.p Two classes with the same complete description are equivalent
$\forall a, b$: (($a = b$ and cc$_1$(a)) $\Rightarrow$ cc$_1$(b)) fof(cc1_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cc$_2$(a)) $\Rightarrow$ cc$_2$(b)) fof(cc2_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rp(a, c)) $\Rightarrow$ rp(b, c)) fof(rp_substitution$_1$, axiom)
$\forall a, b, c$: (($a = b$ and rp(c, a)) $\Rightarrow$ rp(c, b)) fof(rp_substitution$_2$, axiom)
$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution$_1$, axiom)
$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cc$_1$(x) $\iff$ ($\exists y_0$: rp(x, y_0) and $\forall y_0, y_1$: ((rp(x, y_0) and rp(x, y_1)) $\Rightarrow$ $y_0 = y_1$))) fof(axiom$_2$, axiom)
$\forall x$: (cc$_2$(x) $\iff$ ($\exists y_0$: rp(x, y_0) and $\forall y_0, y_1$: ((rp(x, y_0) and rp(x, y_1)) $\Rightarrow$ $y_0 = y_1$))) fof(axiom$_3$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x$: (cc$_1$(x) $\iff$ cc$_2$(x)) fof(the_axiom, conjecture)

KRS168+1.p De Morgan's law
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x$: (($\neg$ cB(x) and $\neg$ cA(x)) $\Leftarrow$
$\neg$ cA(x) or cB(x)) fof(the_axiom, conjecture)

KRS169+1.p hasLeader may be stated as the owl:equivalentProperty of hasHead
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)
$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)
cowlThing(iX) fof(axiom$_2$, axiom)
rhasLeader(iX, iY) fof(axiom$_3$, axiom)
cowlThing(iY) fof(axiom$_4$, axiom)
$\forall x, y$: (rhasLeader(x, y) $\iff$ rhasHead(x, y)) fof(axiom$_5$, axiom)
$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and cowlThing(iX) and rhasHead(i

KRS170+1.p Deduction from hasLeader

A reasoner can also deduce that hasLeader is a subProperty of hasHead and hasHead is a subProperty of hasLeader.

$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)

$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)

$\forall x, y$: (rhasLeader(x, y) $\iff$ rhasHead(x, y)) fof(axiom$_2$, axiom)

$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x, y$: (rhasLeader(x, y) $\Rightarrow$ rhasHead(x, y)) and $\forall x, y$: (rhasHead(x, y) $\Rightarrow$ rhasLeader(x, y)) fof(the_axiom, conjecture)

KRS171+1.p The inverse entailment of test 002 also holds

$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)

$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)

$\forall x, y$: (rhasHead(x, y) $\Rightarrow$ rhasLeader(x, y)) fof(axiom$_2$, axiom)

$\forall x, y$: (rhasLeader(x, y) $\Rightarrow$ rhasHead(x, y)) fof(axiom$_3$, axiom)

$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x, y$: (rhasLeader(x, y) $\iff$ rhasHead(x, y)) fof(the_axiom, conjecture)

KRS172+1.p The same property extension means equivalentProperty

If p and q have the same property extension then p equivalentProperty q.

$\forall a, b$: (($a = b$ and cd(a)) $\Rightarrow$ cd(b)) fof(cd_substitution$_1$, axiom)

$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution$_1$, axiom)

$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution$_1$, axiom)

$\forall a, b, c$: (($a = b$ and rp(a, c)) $\Rightarrow$ rp(b, c)) fof(rp_substitution$_1$, axiom)

$\forall a, b, c$: (($a = b$ and rp(c, a)) $\Rightarrow$ rp(c, b)) fof(rp_substitution$_2$, axiom)

$\forall a, b, c$: (($a = b$ and rq(a, c)) $\Rightarrow$ rq(b, c)) fof(rq_substitution$_1$, axiom)

$\forall a, b, c$: (($a = b$ and rq(c, a)) $\Rightarrow$ rq(c, b)) fof(rq_substitution$_2$, axiom)

$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution$_1$, axiom)

$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution$_1$, axiom)

$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)

$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)

$\forall x$: (cd(x) $\iff$ rq(x, iv)) fof(axiom$_2$, axiom)

$\forall x$: (cd(x) $\iff$ rp(x, iv)) fof(axiom$_3$, axiom)

$\forall x, y, z$: ((rp(x, y) and rp(x, z)) $\Rightarrow$ $y = z$) fof(axiom$_4$, axiom)

$\forall x, y$: (rp(x, y) $\Rightarrow$ cd(x)) fof(axiom$_5$, axiom)

$\forall x, y, z$: ((rq(x, y) and rq(x, z)) $\Rightarrow$ $y = z$) fof(axiom$_6$, axiom)

$\forall x, y$: (rq(x, y) $\Rightarrow$ cd(x)) fof(axiom$_7$, axiom)

cowlThing(iv) fof(axiom$_8$, axiom)

$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and $\forall x, y$: (rq(x, y) $\iff$ rp(x, y)) fof(the_axiom, conjecture)

KRS173+1.p A simple infinite loop for implementors to avoid

$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)

$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)

$\forall x$: (cperson(x) $\iff$ $\exists y$: (rparent(x, y) and cperson(y))) fof(axiom$_2$, axiom)

cperson(ifred) fof(axiom$_3$, axiom)

$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) and $\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) and cowlThing(ifred) and rparent(i

KRS174+1.p Sets with appropriate extensions are related by unionOf

$\forall a, b$: (($a = b$ and cA(a)) $\Rightarrow$ cA(b)) fof(cA_substitution$_1$, axiom)

$\forall a, b$: (($a = b$ and cA_and_B(a)) $\Rightarrow$ cA_and_B(b)) fof(cA_and_B_substitution$_1$, axiom)

$\forall a, b$: (($a = b$ and cB(a)) $\Rightarrow$ cB(b)) fof(cB_substitution$_1$, axiom)

$\forall a, b$: (($a = b$ and cowlNothing(a)) $\Rightarrow$ cowlNothing(b)) fof(cowlNothing_substitution$_1$, axiom)

$\forall a, b$: (($a = b$ and cowlThing(a)) $\Rightarrow$ cowlThing(b)) fof(cowlThing_substitution$_1$, axiom)

$\forall a, b$: (($a = b$ and xsd_integer(a)) $\Rightarrow$ xsd_integer(b)) fof(xsd_integer_substitution$_1$, axiom)

$\forall a, b$: (($a = b$ and xsd_string(a)) $\Rightarrow$ xsd_string(b)) fof(xsd_string_substitution$_1$, axiom)

$\forall x$: (cowlThing(x) and $\neg$ cowlNothing(x)) fof(axiom$_0$, axiom)

$\forall x$: (xsd_string(x) $\iff$ $\neg$ xsd_integer(x)) fof(axiom$_1$, axiom)

$\forall x$: (cA(x) $\iff$ $x =$ ia) fof(axiom$_2$, axiom)

$\forall x$: (cA_and_B(x) $\iff$ ($x =$ ib or $x =$ ia)) fof(axiom$_3$, axiom)

$\forall x$: (cB(x) $\iff$ $x =$ ib) fof(axiom$_4$, axiom)

cowlThing(ia) fof(axiom$_5$, axiom)

cowlThing(ib) fof(axiom$_6$, axiom)

$\forall x\colon (\text{cowlThing}(x) \text{ and } \neg\,\text{cowlNothing}(x)) \text{ and } \forall x\colon (\text{xsd\_string}(x) \iff \neg\,\text{xsd\_integer}(x)) \text{ and } \forall x\colon (\text{cA\_and\_B}(x) \iff (\text{cB}(x) \text{ or } \text{cA}(x)))$ fof(the_axiom, conjecture)

KRS175+1.p An inverse to test unionOf-003
$\forall a, b\colon ((a = b \text{ and } \text{cA}(a)) \Rightarrow \text{cA}(b))$ $\text{fof}(\text{cA\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and } \text{cA\_and\_B}(a)) \Rightarrow \text{cA\_and\_B}(b))$ $\text{fof}(\text{cA\_and\_B\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and } \text{cB}(a)) \Rightarrow \text{cB}(b))$ $\text{fof}(\text{cB\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and } \text{cowlNothing}(a)) \Rightarrow \text{cowlNothing}(b))$ $\text{fof}(\text{cowlNothing\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and } \text{cowlThing}(a)) \Rightarrow \text{cowlThing}(b))$ $\text{fof}(\text{cowlThing\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and } \text{xsd\_integer}(a)) \Rightarrow \text{xsd\_integer}(b))$ $\text{fof}(\text{xsd\_integer\_substitution}_1, \text{axiom})$
$\forall a, b\colon ((a = b \text{ and } \text{xsd\_string}(a)) \Rightarrow \text{xsd\_string}(b))$ $\text{fof}(\text{xsd\_string\_substitution}_1, \text{axiom})$
$\forall x\colon (\text{cowlThing}(x) \text{ and } \neg\,\text{cowlNothing}(x))$ $\text{fof}(\text{axiom}_0, \text{axiom})$
$\forall x\colon (\text{xsd\_string}(x) \iff \neg\,\text{xsd\_integer}(x))$ $\text{fof}(\text{axiom}_1, \text{axiom})$
$\forall x\colon (\text{cA}(x) \iff x = \text{ia})$ $\text{fof}(\text{axiom}_2, \text{axiom})$
$\forall x\colon (\text{cA\_and\_B}(x) \iff (\text{cA}(x) \text{ or } \text{cB}(x)))$ $\text{fof}(\text{axiom}_3, \text{axiom})$
$\forall x\colon (\text{cB}(x) \iff x = \text{ib})$ $\text{fof}(\text{axiom}_4, \text{axiom})$
cowlThing(ia) $\text{fof}(\text{axiom}_5, \text{axiom})$
cowlThing(ib) $\text{fof}(\text{axiom}_6, \text{axiom})$
$\forall x\colon (\text{cowlThing}(x) \text{ and } \neg\,\text{cowlNothing}(x)) \text{ and } \forall x\colon (\text{xsd\_string}(x) \iff \neg\,\text{xsd\_integer}(x)) \text{ and } \forall x\colon (\text{cA\_and\_B}(x) \iff (x = \text{ib} \text{ or } x = \text{ia})) \text{ and cowlThing(ia) and cowlThing(ib)}$ fof(the_axiom, conjecture)

KRS176+1.p isa is reflexive
include('Axioms/KRS001+0.ax')

KRS177+1.p isa is transitive
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')

KRS178+1.p isa is exclusive of nota, nevera, and xora
include('Axioms/KRS001+1.ax')
$\forall s_1\colon \text{isa}(s_1, s_1)$ fof(isa_reflexive, conjecture)

KRS179+1.p If S1 isa S2 and S1 is nota S3, then S2 is nota S3
include('Axioms/KRS001+1.ax')
$\forall s_1, s_2, s_3\colon ((\text{isa}(s_1, s_2) \text{ and } \text{isa}(s_2, s_3)) \Rightarrow \text{isa}(s_1, s_3))$ fof(isa_transitive, conjecture)

KRS180+1.p isa is incompatible with nota, nevera, and xora
include('Axioms/KRS001+1.ax')
$\forall s_1, s_2\colon \exists \text{ax}, c\colon (\text{status}(\text{ax}, c, s_1) \Rightarrow \neg\,\text{isa}(s_1, s_2) \text{ and } (\text{nota}(s_1, s_2) \text{ or } \text{nevera}(s_1, s_2) \text{ or } \text{xora}(s_1, s_2)))$ fof(isa_exclusive, conje

KRS181+1.p If S1 isa S2, and S1 nota S3, then S2 nota S3
include('Axioms/KRS001+1.ax')
$\forall s_1, s_2, s_3\colon ((\text{isa}(s_1, s_2) \text{ and } \text{nota}(s_1, s_3)) \Rightarrow \text{nota}(s_2, s_3))$ fof(nota_isa_nota, conjecture)

KRS182+1.p UNP isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(unp, thm) fof(isa_unp_thm, conjecture)

KRS183+1.p SAP isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(sap, thm) fof(isa_sap_thm, conjecture)

KRS184+1.p ESA isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(esa, thm) fof(isa_esa_thm, conjecture)

KRS185+1.p SAT isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(sat, thm) fof(isa_sat_thm, conjecture)

KRS186+1.p EQV isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')

isa(eqv, thm) fof(isa_eqv_thm, conjecture)

KRS187+1.p TAC isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(tac, thm) fof(isa_tac_thm, conjecture)

KRS188+1.p WEC isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(wec, thm) fof(isa_wec_thm, conjecture)

KRS189+1.p ETH isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(eth, thm) fof(isa_eth_thm, conjecture)

KRS190+1.p TAU isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(tau, thm) fof(isa_tau_thm, conjecture)

KRS191+1.p WTC isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(wtc, thm) fof(isa_wtc_thm, conjecture)

KRS192+1.p WTH isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(wth, thm) fof(isa_wth_thm, conjecture)

KRS193+1.p CAX isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(cax, thm) fof(isa_cax_thm, conjecture)

KRS194+1.p SCA isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(sca, thm) fof(isa_sca_thm, conjecture)

KRS195+1.p TCA isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(tca, thm) fof(isa_tca_thm, conjecture)

KRS196+1.p WCA isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(wca, thm) fof(isa_wca_thm, conjecture)

KRS197+1.p CSA isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(csa, thm) fof(isa_csa_thm, conjecture)

KRS198+1.p UNS isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(uns, thm) fof(isa_uns_thm, conjecture)

KRS199+1.p NOC isa THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
isa(noc, thm) fof(isa_noc_thm, conjecture)

KRS200+1.p UNP nota THM

include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(unp, thm)   fof(nota_unp_thm, conjecture)

KRS201+1.p SAP nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(sap, thm)   fof(nota_sap_thm, conjecture)

KRS202+1.p ESA nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(esa, thm)   fof(nota_esa_thm, conjecture)

KRS203+1.p SAT nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(sat, thm)   fof(nota_sat_thm, conjecture)

KRS204+1.p EQV nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(eqv, thm)   fof(nota_eqv_thm, conjecture)

KRS205+1.p TAC nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(tac, thm)   fof(nota_tac_thm, conjecture)

KRS206+1.p WEC nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(wec, thm)   fof(nota_wec_thm, conjecture)

KRS207+1.p ETH nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(eth, thm)   fof(nota_eth_thm, conjecture)

KRS208+1.p TAU nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(tau, thm)   fof(nota_tau_thm, conjecture)

KRS209+1.p WTC nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(wtc, thm)   fof(nota_wtc_thm, conjecture)

KRS210+1.p WTH nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(wth, thm)   fof(nota_wth_thm, conjecture)

KRS211+1.p CAX nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(cax, thm)   fof(nota_cax_thm, conjecture)

KRS212+1.p SCA nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(sca, thm)   fof(nota_sca_thm, conjecture)

KRS213+1.p TCA nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')

nota(tca, thm)   fof(nota_tca_thm, conjecture)

KRS214+1.p WCA nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(wca, thm)   fof(nota_wca_thm, conjecture)

KRS215+1.p CSA nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(csa, thm)   fof(nota_csa_thm, conjecture)

KRS216+1.p UNS nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(uns, thm)   fof(nota_uns_thm, conjecture)

KRS217+1.p NOC nota THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nota(noc, thm)   fof(nota_noc_thm, conjecture)

KRS218+1.p UNP nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(unp, thm)   fof(nevera_unp_thm, conjecture)

KRS219+1.p SAP nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(sap, thm)   fof(nevera_sap_thm, conjecture)

KRS220+1.p ESA nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(esa, thm)   fof(nevera_esa_thm, conjecture)

KRS221+1.p SAT nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(sat, thm)   fof(nevera_sat_thm, conjecture)

KRS222+1.p EQV nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(eqv, thm)   fof(nevera_eqv_thm, conjecture)

KRS223+1.p TAC nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(tac, thm)   fof(nevera_tac_thm, conjecture)

KRS224+1.p WEC nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(wec, thm)   fof(nevera_wec_thm, conjecture)

KRS225+1.p ETH nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(eth, thm)   fof(nevera_eth_thm, conjecture)

KRS226+1.p TAU nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(tau, thm)   fof(nevera_tau_thm, conjecture)

KRS227+1.p WTC nevera THM

include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(wtc, thm)   fof(nevera_wtc_thm, conjecture)

KRS228+1.p WTH nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(wth, thm)   fof(nevera_wth_thm, conjecture)

KRS229+1.p CAX nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(cax, thm)   fof(nevera_cax_thm, conjecture)

KRS230+1.p SCA nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(sca, thm)   fof(nevera_sca_thm, conjecture)

KRS231+1.p TCA nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(tca, thm)   fof(nevera_tca_thm, conjecture)

KRS232+1.p WCA nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(wca, thm)   fof(nevera_wca_thm, conjecture)

KRS233+1.p CSA nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(csa, thm)   fof(nevera_csa_thm, conjecture)

KRS234+1.p UNS nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(uns, thm)   fof(nevera_uns_thm, conjecture)

KRS235+1.p NOC nevera THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
nevera(noc, thm)   fof(nevera_noc_thm, conjecture)

KRS236+1.p UNP xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(unp, thm)   fof(xora_unp_thm, conjecture)

KRS237+1.p SAP xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(sap, thm)   fof(xora_sap_thm, conjecture)

KRS238+1.p ESA xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(esa, thm)   fof(xora_esa_thm, conjecture)

KRS239+1.p SAT xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(sat, thm)   fof(xora_sat_thm, conjecture)

KRS240+1.p EQV xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')

xora(eqv, thm) fof(xora_eqv_thm, conjecture)

KRS241+1.p TAC xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(tac, thm) fof(xora_tac_thm, conjecture)

KRS242+1.p WEC xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(wec, thm) fof(xora_wec_thm, conjecture)

KRS243+1.p ETH xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(eth, thm) fof(xora_eth_thm, conjecture)

KRS244+1.p TAU xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(tau, thm) fof(xora_tau_thm, conjecture)

KRS245+1.p WTC xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(wtc, thm) fof(xora_wtc_thm, conjecture)

KRS246+1.p WTH xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(wth, thm) fof(xora_wth_thm, conjecture)

KRS247+1.p CAX xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(cax, thm) fof(xora_cax_thm, conjecture)

KRS248+1.p SCA xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(sca, thm) fof(xora_sca_thm, conjecture)

KRS249+1.p TCA xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(tca, thm) fof(xora_tca_thm, conjecture)

KRS250+1.p WCA xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(wca, thm) fof(xora_wca_thm, conjecture)

KRS251+1.p CSA xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(csa, thm) fof(xora_csa_thm, conjecture)

KRS252+1.p UNS xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(uns, thm) fof(xora_uns_thm, conjecture)

KRS253+1.p NOC xora THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
xora(noc, thm) fof(xora_noc_thm, conjecture)

KRS254+1.p UNP mighta THM

include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(unp, thm) fof(mighta_unp_thm, conjecture)

KRS255+1.p SAP mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(sap, thm) fof(mighta_sap_thm, conjecture)

KRS256+1.p ESA mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(esa, thm) fof(mighta_esa_thm, conjecture)

KRS257+1.p SAT mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(sat, thm) fof(mighta_sat_thm, conjecture)

KRS258+1.p EQV mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(eqv, thm) fof(mighta_eqv_thm, conjecture)

KRS259+1.p TAC mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(tac, thm) fof(mighta_tac_thm, conjecture)

KRS260+1.p WEC mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(wec, thm) fof(mighta_wec_thm, conjecture)

KRS261+1.p ETH mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(eth, thm) fof(mighta_eth_thm, conjecture)

KRS262+1.p TAU mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(tau, thm) fof(mighta_tau_thm, conjecture)

KRS263+1.p WTC mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(wtc, thm) fof(mighta_wtc_thm, conjecture)

KRS264+1.p WTH mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(wth, thm) fof(mighta_wth_thm, conjecture)

KRS265+1.p CAX mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(cax, thm) fof(mighta_cax_thm, conjecture)

KRS266+1.p SCA mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(sca, thm) fof(mighta_sca_thm, conjecture)

KRS267+1.p TCA mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')

mighta(tca, thm)   fof(mighta_tca_thm, conjecture)

KRS268+1.p WCA mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(wca, thm)   fof(mighta_wca_thm, conjecture)

KRS269+1.p CSA mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(csa, thm)   fof(mighta_csa_thm, conjecture)

KRS270+1.p UNS mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(uns, thm)   fof(mighta_uns_thm, conjecture)

KRS271+1.p NOC mighta THM
include('Axioms/KRS001+0.ax')
include('Axioms/KRS001+1.ax')
mighta(noc, thm)   fof(mighta_noc_thm, conjecture)

KRS272^7.p Generation of abstract instructions: enter a number in a(#box
include('Axioms/LCL015^0.ax')
include('Axioms/LCL013^5.ax')
include('Axioms/LCL015^1.ax')
string: mu → \$i → \$o   thf(string_type, type)
in: mu → mu → mu → \$i → \$o   thf(in_type, type)
do: mu → mu → mu → \$i → \$o   thf(do_type, type)
number: mu → mu → \$i → \$o   thf(number_type, type)
entry_box: mu → \$i → \$o   thf(entry_box_type, type)
userid: mu → mu → \$i → \$o   thf(userid_type, type)
1: mu   thf(one_type, type)
∀v: \$i: (exists_in_world@1@v)   thf(existence_of_one_ax, axiom)
u: mu   thf(u_type, type)
∀v: \$i: (exists_in_world@u@v)   thf(existence_of_u_ax, axiom)
mvalid@(mbox_s$_4$@(mexists_ind@λi: mu: (mbox_s$_4$@(mand@(userid@u@i)@(string@i)))))   thf(ax$_1$, axiom)
mvalid@(mexists_ind@λb: mu: (mbox_s$_4$@(mand@(entry_box@b)@(number@b@1))))   thf(ax$_2$, axiom)
mvalid@(mbox_s$_4$@(mforall_ind@λs: mu: (mforall_ind@λi: mu: (mforall_ind@λb: mu: (mimplies@(mand@(string@i)@(entry_b
mvalid@(mbox_s$_4$@(mexists_ind@λi: mu: (mexists_ind@λb: mu: (mexists_ind@λa: mu: (mexists_ind@λs: mu: (mand@(mbox_s

KRS273^7.p Querying description logic knowledge bases
include('Axioms/LCL015^0.ax')
include('Axioms/LCL013^5.ax')
include('Axioms/LCL015^1.ax')
female: mu → \$i → \$o   thf(female_type, type)
parent: mu → mu → \$i → \$o   thf(parent_type, type)
male: mu → \$i → \$o   thf(male_type, type)
q_2: mu → \$i → \$o   thf(q2_type, type)
bob: mu   thf(bob_type, type)
∀v: \$i: (exists_in_world@bob@v)   thf(existence_of_bob_ax, axiom)
jane: mu   thf(jane_type, type)
∀v: \$i: (exists_in_world@jane@v)   thf(existence_of_jane_ax, axiom)
ann: mu   thf(ann_type, type)
∀v: \$i: (exists_in_world@ann@v)   thf(existence_of_ann_ax, axiom)
mary: mu   thf(mary_type, type)
∀v: \$i: (exists_in_world@mary@v)   thf(existence_of_mary_ax, axiom)
paul: mu   thf(paul_type, type)
∀v: \$i: (exists_in_world@paul@v)   thf(existence_of_paul_ax, axiom)
john: mu   thf(john_type, type)
∀v: \$i: (exists_in_world@john@v)   thf(existence_of_john_ax, axiom)
mvalid@(mbox_s$_4$@(mand@(female@mary)@(mand@(female@ann)@(mand@(female@jane)@(mand@(male@bob)@(mand@(r
mvalid@(mforall_ind@λx: mu: (mimplies@(mbox_s$_4$@(male@x))@(mbox_s$_4$@(mnot@(female@x)))))   thf(tbox, axiom)

mvalid@(mforall_ind@λx: mu: (mequiv@(q_2@x)@(mand@(mbox_s$_4$@(male@x))@(mnot@(mbox_s$_4$@(mexists_ind@λy: mu: (m
mvalid@(mand@(q_2@john)@(q_2@paul))   thf(con, conjecture)

KRS274$\wedge$7.p Querying description logic knowledge bases
include('Axioms/LCL015^0.ax')
include('Axioms/LCL013^5.ax')
include('Axioms/LCL015^1.ax')
female: mu $\rightarrow$ \$i $\rightarrow$ \$o   thf(female_type, type)
male: mu $\rightarrow$ \$i $\rightarrow$ \$o   thf(male_type, type)
parent: mu $\rightarrow$ mu $\rightarrow$ \$i $\rightarrow$ \$o   thf(parent_type, type)
q_3: mu $\rightarrow$ \$i $\rightarrow$ \$o   thf(q3_type, type)
john: mu   thf(john_type, type)
$\forall v$: \$i: (exists_in_world@john@v)   thf(existence_of_john_ax, axiom)
bob: mu   thf(bob_type, type)
$\forall v$: \$i: (exists_in_world@bob@v)   thf(existence_of_bob_ax, axiom)
ann: mu   thf(ann_type, type)
$\forall v$: \$i: (exists_in_world@ann@v)   thf(existence_of_ann_ax, axiom)
mary: mu   thf(mary_type, type)
$\forall v$: \$i: (exists_in_world@mary@v)   thf(existence_of_mary_ax, axiom)
paul: mu   thf(paul_type, type)
$\forall v$: \$i: (exists_in_world@paul@v)   thf(existence_of_paul_ax, axiom)
jane: mu   thf(jane_type, type)
$\forall v$: \$i: (exists_in_world@jane@v)   thf(existence_of_jane_ax, axiom)
mvalid@(mbox_s$_4$@(mand@(female@mary)@(mand@(female@ann)@(mand@(female@jane)@(mand@(male@bob)@(mand@(r
mvalid@(mforall_ind@λx: mu: (mimplies@(mbox_s$_4$@(male@x))@(mbox_s$_4$@(mnot@(female@x)))))   thf(tbox, axiom)
mvalid@(mforall_ind@λx: mu: (mequiv@(q_3@x)@(mexists_ind@λy: mu: (mand@(mbox_s$_4$@(parent@y@x))@(mforall_ind@λz:
mvalid@(mand@(q_3@jane)@(q_3@paul))   thf(con, conjecture)

KRS275$\wedge$7.p Database querying
include('Axioms/LCL015^0.ax')
include('Axioms/LCL013^5.ax')
include('Axioms/LCL015^1.ax')
teach: mu $\rightarrow$ mu $\rightarrow$ \$i $\rightarrow$ \$o   thf(teach_type, type)
sue: mu   thf(sue_type, type)
$\forall v$: \$i: (exists_in_world@sue@v)   thf(existence_of_sue_ax, axiom)
psych: mu   thf(psych_type, type)
$\forall v$: \$i: (exists_in_world@psych@v)   thf(existence_of_psych_ax, axiom)
mary: mu   thf(mary_type, type)
$\forall v$: \$i: (exists_in_world@mary@v)   thf(existence_of_mary_ax, axiom)
cs: mu   thf(cs_type, type)
$\forall v$: \$i: (exists_in_world@cs@v)   thf(existence_of_cs_ax, axiom)
math: mu   thf(math_type, type)
$\forall v$: \$i: (exists_in_world@math@v)   thf(existence_of_math_ax, axiom)
john: mu   thf(john_type, type)
$\forall v$: \$i: (exists_in_world@john@v)   thf(existence_of_john_ax, axiom)
mvalid@(mbox_s$_4$@(mand@(teach@john@math)@(mand@(mexists_ind@λx: mu: (teach@x@cs))@(mand@(teach@mary@psyc
mvalid@(mexists_ind@λx: mu: (mbox_s$_4$@(teach@john@x)))   thf(query, conjecture)

KRS276$\wedge$7.p Database querying
include('Axioms/LCL015^0.ax')
include('Axioms/LCL013^5.ax')
include('Axioms/LCL015^1.ax')
teach: mu $\rightarrow$ mu $\rightarrow$ \$i $\rightarrow$ \$o   thf(teach_type, type)
sue: mu   thf(sue_type, type)
$\forall v$: \$i: (exists_in_world@sue@v)   thf(existence_of_sue_ax, axiom)
psych: mu   thf(psych_type, type)
$\forall v$: \$i: (exists_in_world@psych@v)   thf(existence_of_psych_ax, axiom)
mary: mu   thf(mary_type, type)
$\forall v$: \$i: (exists_in_world@mary@v)   thf(existence_of_mary_ax, axiom)
math: mu   thf(math_type, type)
$\forall v$: \$i: (exists_in_world@math@v)   thf(existence_of_math_ax, axiom)

john: mu thf(john_type, type)
$\forall v$: \$i: (exists_in_world@john@v) thf(existence_of_john_ax, axiom)
cs: mu thf(cs_type, type)
$\forall v$: \$i: (exists_in_world@cs@v) thf(existence_of_cs_ax, axiom)
mvalid@(mbox_s_4@(mand@(teach@john@math)@(mand@(mexists_ind@λx: mu: (teach@x@cs))@(mand@(teach@mary@psyc
mvalid@(mbox_s_4@(mexists_ind@λx: mu: (teach@x@cs))) thf(query, conjecture)

KRS277∧7.p Database querying
include('Axioms/LCL015ˆ0.ax')
include('Axioms/LCL013ˆ5.ax')
include('Axioms/LCL015ˆ1.ax')
teach: mu → mu → \$i → \$o thf(teach_type, type)
sue: mu thf(sue_type, type)
$\forall v$: \$i: (exists_in_world@sue@v) thf(existence_of_sue_ax, axiom)
mary: mu thf(mary_type, type)
$\forall v$: \$i: (exists_in_world@mary@v) thf(existence_of_mary_ax, axiom)
math: mu thf(math_type, type)
$\forall v$: \$i: (exists_in_world@math@v) thf(existence_of_math_ax, axiom)
john: mu thf(john_type, type)
$\forall v$: \$i: (exists_in_world@john@v) thf(existence_of_john_ax, axiom)
cs: mu thf(cs_type, type)
$\forall v$: \$i: (exists_in_world@cs@v) thf(existence_of_cs_ax, axiom)
psych: mu thf(psych_type, type)
$\forall v$: \$i: (exists_in_world@psych@v) thf(existence_of_psych_ax, axiom)
mvalid@(mbox_s_4@(mand@(teach@john@math)@(mand@(mexists_ind@λx: mu: (teach@x@cs))@(mand@(teach@mary@psyc
mvalid@(mexists_ind@λx: mu: (mand@(teach@x@psych)@(mnot@(mbox_s_4@(teach@x@cs))))) thf(query, conjecture)