LDA axioms

LDA001-0.ax Embedding algebra
LD-algebras are related to large cardinals. Under a very strong large cardinal assumption, the free-monogenic LD-algebra can be represented by an algebra of elementary embeddings. Theorems about this algebra can be proved from a small number of properties, suggesting the definition of an embedding algebra.
$f(x, f(y, z)) = f(f(x, y), f(x, z))$ cnf(a_1, axiom)
$a(x, a(y, z)) = a(f(x, y), a(x, z))$ cnf(a1a, axiom)
critical_point($f(u, v)$) = $a(u$, critical_point(v)) cnf(a_2, axiom)
¬ less(x, x) cnf(b_1, axiom)
less(x, y) or less(y, x) or $x = y$ cnf(b_2, axiom)
(less(x, y) and less(y, z)) ⇒ less(x, z) cnf(b_3, axiom)
less(x, y) ⇒ less($a(u, x), a(u, y)$) cnf(b_4, axiom)
less(x, critical_point(u)) ⇒ $a(u, x) = x$ cnf(c_2, axiom)
less(x, critical_point(u)) or less($x, a(u, x)$) cnf(c_3, axiom)

LDA problems

LDA001-1.p Verify 3*2*U = UUU, where U = 2*2
$f(x, f(y, z)) = f(f(x, y), f(x, z))$ cnf(a_1, axiom)
$n_2 = f(n_1, n_1)$ cnf(clause$_2$, axiom)
$n_3 = f(n_2, n_1)$ cnf(clause$_3$, axiom)
$u = f(n_2, n_2)$ cnf(clause$_4$, axiom)
$f(f(n_3, n_2), u) \neq f(f(u, u), u)$ cnf(prove_equation, negated_conjecture)

LDA002-1.p Verify 3*2(U2)(UU(UU)) = U1(U3)(UU(UU))
$f(x, f(y, z)) = f(f(x, y), f(x, z))$ cnf(a_1, axiom)
$n_2 = f(n_1, n_1)$ cnf(clause$_2$, axiom)
$n_3 = f(n_2, n_1)$ cnf(clause$_3$, axiom)
$u = f(n_2, n_2)$ cnf(clause$_4$, axiom)
$u_1 = f(u, n_1)$ cnf(clause$_5$, axiom)
$u_2 = f(u, n_2)$ cnf(clause$_6$, axiom)
$u_3 = f(u, n_3)$ cnf(clause$_7$, axiom)
uu $= f(u, u)$ cnf(clause$_8$, axiom)
$a = f(f(n_3, n_2), u_2)$ cnf(clause$_9$, axiom)
$b = f(u_1, u_3)$ cnf(clause$_{10}$, axiom)
$v = f(\text{uu}, \text{uu})$ cnf(clause$_{11}$, axiom)
$f(a, v) \neq f(b, v)$ cnf(prove_equation, negated_conjecture)

LDA003-1.p Show that 3 is a left segment of U = 2*2
$f(x, f(y, z)) = f(f(x, y), f(x, z))$ cnf(a_1, axiom)
left($x, f(x, y)$) cnf(a_2, axiom)
(left(x, y) and left(y, z)) ⇒ left(x, z) cnf(a_3, axiom)
$n_2 = f(n_1, n_1)$ cnf(clause$_4$, axiom)
$n_3 = f(n_2, n_1)$ cnf(clause$_5$, axiom)
$u = f(n_2, n_2)$ cnf(clause$_6$, axiom)
¬ left(n_3, u) cnf(prove_equation, negated_conjecture)

LDA004-1.p Show that 3*2(U2) is a left segment of U1(U3)
$f(x, f(y, z)) = f(f(x, y), f(x, z))$ cnf(a_1, axiom)
left($x, f(x, y)$) cnf(a_2, axiom)
(left(x, y) and left(y, z)) ⇒ left(x, z) cnf(a_3, axiom)
$n_2 = f(n_1, n_1)$ cnf(clause$_4$, axiom)
$n_3 = f(n_2, n_1)$ cnf(clause$_5$, axiom)
$u = f(n_2, n_2)$ cnf(clause$_6$, axiom)
$u_1 = f(u, n_1)$ cnf(clause$_7$, axiom)
$u_2 = f(u, n_2)$ cnf(clause$_8$, axiom)
$u_3 = f(u, n_3)$ cnf(clause$_9$, axiom)
$a = f(f(n_3, n_2), u_2)$ cnf(clause$_{10}$, axiom)
$b = f(u_1, u_3)$ cnf(clause$_{11}$, axiom)
¬ left(a, b) cnf(prove_equation, negated_conjecture)

LDA005-1.p Let g=cr(t). Show that tt(tsg) < t(tsg) (for any s)
include('Axioms/LDA001-0.ax')
$\mathrm{tt} = f(t,t)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_1, \mathrm{axiom})$
$\mathrm{st} = f(s,t)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_2, \mathrm{axiom})$
$\mathrm{ts} = f(t,s)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_3, \mathrm{axiom})$
$k = \mathrm{critical\_point}(t)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_4, \mathrm{axiom})$
$\mathrm{sk} = f(s,k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_5, \mathrm{axiom})$
$\mathrm{tk} = f(t,k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_6, \mathrm{axiom})$
$\mathrm{stk} = f(\mathrm{st},k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_7, \mathrm{axiom})$
$\mathrm{tsk} = f(\mathrm{ts},k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_8, \mathrm{axiom})$
$\neg\,\mathrm{less}(f(\mathrm{tt},\mathrm{tsk}), f(t,\mathrm{tsk}))$ $\quad$ $\mathrm{cnf}(\mathrm{prove\_equation}, \mathrm{negated\_conjecture})$

LDA005-2.p Let g=cr(t). Show that tt(tsg) < t(tsg) (for any s)
$f(x,f(y,z)) = f(f(x,y),f(x,z))$ $\quad$ $\mathrm{cnf}(a_1, \mathrm{axiom})$
$a(x,a(y,z)) = a(f(x,y),a(x,z))$ $\quad$ $\mathrm{cnf}(\mathrm{a1a}, \mathrm{axiom})$
$\mathrm{critical\_point}(f(u,v)) = a(u,\mathrm{critical\_point}(v))$ $\quad$ $\mathrm{cnf}(a_2, \mathrm{axiom})$
$\neg\,\mathrm{less}(x,x)$ $\quad$ $\mathrm{cnf}(b_1, \mathrm{axiom})$
$\mathrm{less}(x,y) \Rightarrow \mathrm{less}(a(u,x),a(u,y))$ $\quad$ $\mathrm{cnf}(b_4, \mathrm{axiom})$
$x = a(u,x)$ or $\mathrm{less}(x,a(u,x))$ $\quad$ $\mathrm{cnf}(c_1, \mathrm{axiom})$
$\mathrm{less}(x,\mathrm{critical\_point}(u)) \Rightarrow a(u,x) = x$ $\quad$ $\mathrm{cnf}(c_2, \mathrm{axiom})$
$\mathrm{less}(x,\mathrm{critical\_point}(u))$ or $\mathrm{less}(x,a(u,x))$ $\quad$ $\mathrm{cnf}(c_3, \mathrm{axiom})$
$a(u,x) = x \Rightarrow a(f(v,u),x) = x$ $\quad$ $\mathrm{cnf}(d_2, \mathrm{axiom})$
$\mathrm{tt} = f(t,t)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_1, \mathrm{axiom})$
$\mathrm{st} = f(s,t)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_2, \mathrm{axiom})$
$\mathrm{ts} = f(t,s)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_3, \mathrm{axiom})$
$k = \mathrm{critical\_point}(t)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_4, \mathrm{axiom})$
$\mathrm{sk} = f(s,k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_5, \mathrm{axiom})$
$\mathrm{tk} = f(t,k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_6, \mathrm{axiom})$
$\mathrm{stk} = f(\mathrm{st},k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_7, \mathrm{axiom})$
$\mathrm{tsk} = f(\mathrm{ts},k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_8, \mathrm{axiom})$
$\neg\,\mathrm{less}(f(\mathrm{tt},\mathrm{tsk}), f(t,\mathrm{tsk}))$ $\quad$ $\mathrm{cnf}(\mathrm{prove\_equation}, \mathrm{negated\_conjecture})$

LDA006-1.p Let g = cr(t). Show that tsg is not in the range of t
Showing that tsg is not in the range of t is the same as showing that tsg <> ta for any a.
include('Axioms/LDA001-0.ax')
$\mathrm{tt} = f(t,t)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_1, \mathrm{axiom})$
$\mathrm{st} = f(s,t)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_2, \mathrm{axiom})$
$\mathrm{ts} = f(t,s)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_3, \mathrm{axiom})$
$k = \mathrm{critical\_point}(t)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_4, \mathrm{axiom})$
$\mathrm{sk} = f(s,k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_5, \mathrm{axiom})$
$\mathrm{tk} = f(t,k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_6, \mathrm{axiom})$
$\mathrm{stk} = f(\mathrm{st},k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_7, \mathrm{axiom})$
$\mathrm{tsk} = f(\mathrm{ts},k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_8, \mathrm{axiom})$
$\mathrm{tsk} = f(t,\mathrm{skolem})$ $\quad$ $\mathrm{cnf}(\mathrm{prove\_equation}, \mathrm{negated\_conjecture})$

LDA006-2.p Let g = cr(t). Show that tsg is not in the range of t
Showing that tsg is not in the range of t is the same as showing that tsg <> ta for any a.
$f(x,f(y,z)) = f(f(x,y),f(x,z))$ $\quad$ $\mathrm{cnf}(a_1, \mathrm{axiom})$
$a(x,a(y,z)) = a(f(x,y),a(x,z))$ $\quad$ $\mathrm{cnf}(\mathrm{a1a}, \mathrm{axiom})$
$\mathrm{critical\_point}(f(u,v)) = a(u,\mathrm{critical\_point}(v))$ $\quad$ $\mathrm{cnf}(a_2, \mathrm{axiom})$
$\neg\,\mathrm{less}(x,x)$ $\quad$ $\mathrm{cnf}(b_1, \mathrm{axiom})$
$\mathrm{less}(x,y) \Rightarrow \mathrm{less}(a(u,x),a(u,y))$ $\quad$ $\mathrm{cnf}(b_4, \mathrm{axiom})$
$x = a(u,x)$ or $\mathrm{less}(x,a(u,x))$ $\quad$ $\mathrm{cnf}(c_1, \mathrm{axiom})$
$\mathrm{less}(x,\mathrm{critical\_point}(u)) \Rightarrow a(u,x) = x$ $\quad$ $\mathrm{cnf}(c_2, \mathrm{axiom})$
$\mathrm{less}(x,\mathrm{critical\_point}(u))$ or $\mathrm{less}(x,a(u,x))$ $\quad$ $\mathrm{cnf}(c_3, \mathrm{axiom})$
$a(u,x) = x \Rightarrow a(f(v,u),x) = x$ $\quad$ $\mathrm{cnf}(d_2, \mathrm{axiom})$
$\mathrm{tt} = f(t,t)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_1, \mathrm{axiom})$
$\mathrm{st} = f(s,t)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_2, \mathrm{axiom})$
$\mathrm{ts} = f(t,s)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_3, \mathrm{axiom})$
$k = \mathrm{critical\_point}(t)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_4, \mathrm{axiom})$
$\mathrm{sk} = f(s,k)$ $\quad$ $\mathrm{cnf}(\mathrm{clause}_5, \mathrm{axiom})$

$\text{tk} = f(t, k)$ cnf(clause_6, axiom)
$\text{stk} = f(\text{st}, k)$ cnf(clause_7, axiom)
$\text{tsk} = f(\text{ts}, k)$ cnf(clause_8, axiom)
$\text{tsk} = f(t, \text{skolem})$ cnf(prove_equation, negated_conjecture)

LDA007-1.p Let g = cr(t). Show that t(tsg) = tt(ts)(tg)
include('Axioms/LDA001-0.ax')
$\text{tt} = f(t, t)$ cnf(clause_1, axiom)
$\text{st} = f(s, t)$ cnf(clause_2, axiom)
$\text{ts} = f(t, s)$ cnf(clause_3, axiom)
$\text{tt\_ts} = f(\text{tt}, \text{ts})$ cnf(clause_4, axiom)
$k = \text{critical\_point}(t)$ cnf(clause_5, axiom)
$\text{sk} = f(s, k)$ cnf(clause_6, axiom)
$\text{tk} = f(t, k)$ cnf(clause_7, axiom)
$\text{stk} = f(\text{st}, k)$ cnf(clause_8, axiom)
$\text{tsk} = f(\text{ts}, k)$ cnf(clause_9, axiom)
$\text{ttk} = f(\text{tt}, k)$ cnf(clause_{10}, axiom)
$f(t, \text{tsk}) \neq f(\text{tt\_ts}, \text{tk})$ cnf(prove_equation, negated_conjecture)

LDA007-2.p Let g = cr(t). Show that t(tsg) = tt(ts)(tg)
$f(x, f(y, z)) = f(f(x, y), f(x, z))$ cnf(a_1, axiom)
$a(x, a(y, z)) = a(f(x, y), a(x, z))$ cnf(a1a, axiom)
$\text{critical\_point}(f(u, v)) = a(u, \text{critical\_point}(v))$ cnf(a_2, axiom)
$\neg\, \text{less}(x, x)$ cnf(b_1, axiom)
$\text{less}(x, y) \;\Rightarrow\; \text{less}(a(u, x), a(u, y))$ cnf(b_4, axiom)
$x = a(u, x)$ or $\text{less}(x, a(u, x))$ cnf(c_1, axiom)
$\text{less}(x, \text{critical\_point}(u)) \;\Rightarrow\; a(u, x) = x$ cnf(c_2, axiom)
$\text{less}(x, \text{critical\_point}(u))$ or $\text{less}(x, a(u, x))$ cnf(c_3, axiom)
$a(u, x) = x \;\Rightarrow\; a(f(v, u), x) = x$ cnf(d_2, axiom)
$\text{tt} = f(t, t)$ cnf(clause_1, axiom)
$\text{st} = f(s, t)$ cnf(clause_2, axiom)
$\text{ts} = f(t, s)$ cnf(clause_3, axiom)
$\text{tt\_ts} = f(\text{tt}, \text{ts})$ cnf(clause_4, axiom)
$k = \text{critical\_point}(t)$ cnf(clause_5, axiom)
$\text{sk} = f(s, k)$ cnf(clause_6, axiom)
$\text{tk} = f(t, k)$ cnf(clause_7, axiom)
$\text{stk} = f(\text{st}, k)$ cnf(clause_8, axiom)
$\text{tsk} = f(\text{ts}, k)$ cnf(clause_9, axiom)
$\text{ttk} = f(\text{tt}, k)$ cnf(clause_{10}, axiom)
$f(t, \text{tsk}) \neq f(\text{tt\_ts}, \text{tk})$ cnf(prove_equation, negated_conjecture)

LDA007-3.p Let g = cr(t). Show that t(tsg) = tt(ts)(tg)
$f(x, f(y, z)) = f(f(x, y), f(x, z))$ cnf(a_1, axiom)
$\text{tt} = f(t, t)$ cnf(clause_1, axiom)
$\text{ts} = f(t, s)$ cnf(clause_2, axiom)
$\text{tt\_ts} = f(\text{tt}, \text{ts})$ cnf(clause_3, axiom)
$\text{tk} = f(t, k)$ cnf(clause_4, axiom)
$\text{tsk} = f(\text{ts}, k)$ cnf(clause_5, axiom)
$f(t, \text{tsk}) \neq f(\text{tt\_ts}, \text{tk})$ cnf(prove_equation, negated_conjecture)

LDA008-1.p Let g = cr(t) = cr(T). If Ta < Tsg, then ta < tsg
include('Axioms/LDA001-0.ax')
$\text{ts} = f(t, s)$ cnf(clause_1, axiom)
$\text{bts} = f(\text{bt}, s)$ cnf(clause_2, axiom)
$\text{ta} = f(t, \text{aconst})$ cnf(clause_3, axiom)
$\text{bta} = f(\text{bt}, \text{aconst})$ cnf(clause_4, axiom)
$k = \text{critical\_point}(t)$ cnf(clause_5, axiom)
$\text{critical\_point}(\text{bt}) = k$ cnf(clause_6, axiom)
$\text{tsk} = f(\text{ts}, k)$ cnf(clause_7, axiom)
$\text{btsk} = f(\text{bts}, k)$ cnf(clause_8, axiom)
$\text{less}(\text{bta}, \text{btsk})$ cnf(clause_9, axiom)

$\neg\,$less(ta, tsk)   cnf(prove_equation, negated_conjecture)

LDA008-2.p Let g = cr(t) = cr(T). If Ta < Tsg, then ta < tsg
$f(x, f(y, z)) = f(f(x, y), f(x, z))$ cnf(a_1, axiom)
$a(x, a(y, z)) = a(f(x, y), a(x, z))$ cnf(a1a, axiom)
critical_point($f(u, v)$) = $a(u$, critical_point(v))   cnf(a_2, axiom)
$\neg\,$less(x, x)   cnf(b_1, axiom)
(less(x, y) and less(y, z)) $\Rightarrow$ less(x, z)   cnf(b_3, axiom)
less(x, y) $\Rightarrow$ less($a(u, x), a(u, y)$)   cnf(b_4, axiom)
$x = a(u, x)$ or less($x, a(u, x)$)   cnf(c_1, axiom)
less(x, critical_point(u)) $\Rightarrow$ $a(u, x) = x$ cnf(c_2, axiom)
less(x, critical_point(u)) or less($x, a(u, x)$)   cnf(c_3, axiom)
$a(u, x) = x \Rightarrow a(f(v, u), x) = x$ cnf(d_2, axiom)
bts = f(bt, s)   cnf(clause_2, axiom)
ta = $f(t$, aconst)   cnf(clause_3, axiom)
bta = f(bt, aconst)   cnf(clause_4, axiom)
k = critical_point(t)   cnf(clause_5, axiom)
critical_point(bt) = k cnf(clause_6, axiom)
tsk = f(ts, k)   cnf(clause_7, axiom)
btsk = f(bts, k)   cnf(clause_8, axiom)
less(bta, btsk)   cnf(clause_9, axiom)
$\neg\,$less(ta, tsk)   cnf(prove_equation, negated_conjecture)

LDA009-1.p Let g = cr(t). If g < sg, then st(ts)g < stt(sg)
include('Axioms/LDA001-0.ax')
st = $f(s, t)$ cnf(clause_1, axiom)
stt = f(st, t)   cnf(clause_2, axiom)
sttt = f(stt, t)   cnf(clause_3, axiom)
stts = f(stt, s)   cnf(clause_4, axiom)
ts = $f(t, s)$ cnf(clause_5, axiom)
sts = f(st, s)   cnf(clause_6, axiom)
st_ts = f(st, ts)   cnf(clause_7, axiom)
k = critical_point(t)   cnf(clause_8, axiom)
sk = $f(s, k)$ cnf(clause_9, axiom)
stk = f(st, k)   cnf(clause_{10}, axiom)
less(k, sk)   cnf(clause_{11}, hypothesis)
$\neg\,$less(f(st_ts, k), f(stt, sk))   cnf(prove_equation, negated_conjecture)

LDA009-2.p Let g = cr(t). If g < sg, then st(ts)g < stt(sg)
$f(x, f(y, z)) = f(f(x, y), f(x, z))$ cnf(a_1, axiom)
$a(x, a(y, z)) = a(f(x, y), a(x, z))$ cnf(a1a, axiom)
critical_point($f(u, v)$) = $a(u$, critical_point(v))   cnf(a_2, axiom)
$\neg\,$less(x, x)   cnf(b_1, axiom)
less(x, y) $\Rightarrow$ less($a(u, x), a(u, y)$)   cnf(b_4, axiom)
$x = a(u, x)$ or less($x, a(u, x)$)   cnf(c_1, axiom)
less(x, critical_point(u)) $\Rightarrow$ $a(u, x) = x$ cnf(c_2, axiom)
less(x, critical_point(u)) or less($x, a(u, x)$)   cnf(c_3, axiom)
$a(u, x) = x \Rightarrow a(f(v, u), x) = x$ cnf(d_2, axiom)
stt = f(st, t)   cnf(clause_2, axiom)
sttt = f(stt, t)   cnf(clause_3, axiom)
stts = f(stt, s)   cnf(clause_4, axiom)
ts = $f(t, s)$ cnf(clause_5, axiom)
sts = f(st, s)   cnf(clause_6, axiom)
st_ts = f(st, ts)   cnf(clause_7, axiom)
k = critical_point(t)   cnf(clause_8, axiom)
sk = $f(s, k)$ cnf(clause_9, axiom)
stk = f(st, k)   cnf(clause_{10}, axiom)
less(k, sk)   cnf(clause_{11}, hypothesis)
$\neg\,$less(f(st_ts, k), f(stt, sk))   cnf(prove_equation, negated_conjecture)

LDA010-1.p Let g = cr(t). Show that stts(sttt)(stts)g < stt(sg)

include('Axioms/LDA001-0.ax')
$\mathrm{st} = f(s,t)$ cnf(clause_1, axiom)
$\mathrm{stt} = f(\mathrm{st},t)$ cnf(clause_2, axiom)
$\mathrm{sttt} = f(\mathrm{stt},t)$ cnf(clause_3, axiom)
$\mathrm{stts} = f(\mathrm{stt},s)$ cnf(clause_4, axiom)
$\mathrm{ts} = f(t,s)$ cnf(clause_5, axiom)
$\mathrm{sts} = f(\mathrm{st},s)$ cnf(clause_6, axiom)
$\mathrm{st\_ts} = f(\mathrm{st},\mathrm{ts})$ cnf(clause_7, axiom)
$k = \mathrm{critical\_point}(t)$ cnf(clause_8, axiom)
$\mathrm{sk} = f(s,k)$ cnf(clause_9, axiom)
$\mathrm{stk} = f(\mathrm{st},k)$ cnf(clause_{10}, axiom)
$\mathrm{less}(k,\mathrm{sk})$ cnf(clause_{11}, hypothesis)
$\neg\,\mathrm{less}(f(f(f(\mathrm{stts},\mathrm{sttt}),\mathrm{stts}),k), f(\mathrm{stt},\mathrm{sk}))$ cnf(prove_equation, negated_conjecture)

LDA010-2.p Let g = cr(t). Show that stts(sttt)(stts)g < stt(sg)
$f(x,f(y,z)) = f(f(x,y),f(x,z))$ cnf(a_1, axiom)
$a(x,a(y,z)) = a(f(x,y),a(x,z))$ cnf(a1a, axiom)
$\mathrm{critical\_point}(f(u,v)) = a(u,\mathrm{critical\_point}(v))$ cnf(a_2, axiom)
$\neg\,\mathrm{less}(x,x)$ cnf(b_1, axiom)
$\mathrm{less}(x,y) \Rightarrow \mathrm{less}(a(u,x),a(u,y))$ cnf(b_4, axiom)
$x = a(u,x)$ or $\mathrm{less}(x,a(u,x))$ cnf(c_1, axiom)
$\mathrm{less}(x,\mathrm{critical\_point}(u)) \Rightarrow a(u,x) = x$ cnf(c_2, axiom)
$\mathrm{less}(x,\mathrm{critical\_point}(u))$ or $\mathrm{less}(x,a(u,x))$ cnf(c_3, axiom)
$a(u,x) = x \Rightarrow a(f(v,u),x) = x$ cnf(d_2, axiom)
$\mathrm{stt} = f(\mathrm{st},t)$ cnf(clause_2, axiom)
$\mathrm{sttt} = f(\mathrm{stt},t)$ cnf(clause_3, axiom)
$\mathrm{stts} = f(\mathrm{stt},s)$ cnf(clause_4, axiom)
$\mathrm{ts} = f(t,s)$ cnf(clause_5, axiom)
$\mathrm{sts} = f(\mathrm{st},s)$ cnf(clause_6, axiom)
$\mathrm{st\_ts} = f(\mathrm{st},\mathrm{ts})$ cnf(clause_7, axiom)
$k = \mathrm{critical\_point}(t)$ cnf(clause_8, axiom)
$\mathrm{sk} = f(s,k)$ cnf(clause_9, axiom)
$\mathrm{stk} = f(\mathrm{st},k)$ cnf(clause_{10}, axiom)
$\mathrm{less}(k,\mathrm{sk})$ cnf(clause_{11}, hypothesis)
$\neg\,\mathrm{less}(f(f(f(\mathrm{stts},\mathrm{sttt}),\mathrm{stts}),k), f(\mathrm{stt},\mathrm{sk}))$ cnf(prove_equation, negated_conjecture)

LDA011-1.p Let g = cr(t). Show that stts(sttt)(stts)stts(sttt)g < stt(sg)
include('Axioms/LDA001-0.ax')
$\mathrm{st} = f(s,t)$ cnf(clause_1, axiom)
$\mathrm{stt} = f(\mathrm{st},t)$ cnf(clause_2, axiom)
$\mathrm{sttt} = f(\mathrm{stt},t)$ cnf(clause_3, axiom)
$\mathrm{stts} = f(\mathrm{stt},s)$ cnf(clause_4, axiom)
$\mathrm{ts} = f(t,s)$ cnf(clause_5, axiom)
$\mathrm{sts} = f(\mathrm{st},s)$ cnf(clause_6, axiom)
$\mathrm{st\_ts} = f(\mathrm{st},\mathrm{ts})$ cnf(clause_7, axiom)
$k = \mathrm{critical\_point}(t)$ cnf(clause_8, axiom)
$\mathrm{sk} = f(s,k)$ cnf(clause_9, axiom)
$\mathrm{stk} = f(\mathrm{st},k)$ cnf(clause_{10}, axiom)
$\mathrm{less}(k,\mathrm{sk})$ cnf(clause_{11}, hypothesis)
$\neg\,\mathrm{less}(f(f(f(\mathrm{stts},\mathrm{sttt}),\mathrm{stts}),f(f(\mathrm{stts},\mathrm{sttt}),k)), f(\mathrm{stt},\mathrm{sk}))$ cnf(prove_equation, negated_conjecture)

LDA011-2.p Let g = cr(t). Show that stts(sttt)(stts)stts(sttt)g < stt(sg)
$f(x,f(y,z)) = f(f(x,y),f(x,z))$ cnf(a_1, axiom)
$a(x,a(y,z)) = a(f(x,y),a(x,z))$ cnf(a1a, axiom)
$\mathrm{critical\_point}(f(u,v)) = a(u,\mathrm{critical\_point}(v))$ cnf(a_2, axiom)
$\neg\,\mathrm{less}(x,x)$ cnf(b_1, axiom)
$\mathrm{less}(x,y) \Rightarrow \mathrm{less}(a(u,x),a(u,y))$ cnf(b_4, axiom)
$x = a(u,x)$ or $\mathrm{less}(x,a(u,x))$ cnf(c_1, axiom)
$\mathrm{less}(x,\mathrm{critical\_point}(u)) \Rightarrow a(u,x) = x$ cnf(c_2, axiom)
$\mathrm{less}(x,\mathrm{critical\_point}(u))$ or $\mathrm{less}(x,a(u,x))$ cnf(c_3, axiom)
$a(u,x) = x \Rightarrow a(f(v,u),x) = x$ cnf(d_2, axiom)

$\mathrm{stt} = f(\mathrm{st}, t)$ cnf(clause_2, axiom)
$\mathrm{sttt} = f(\mathrm{stt}, t)$ cnf(clause_3, axiom)
$\mathrm{stts} = f(\mathrm{stt}, s)$ cnf(clause_4, axiom)
$\mathrm{ts} = f(t, s)$ cnf(clause_5, axiom)
$\mathrm{sts} = f(\mathrm{st}, s)$ cnf(clause_6, axiom)
$\mathrm{st\_ts} = f(\mathrm{st}, \mathrm{ts})$ cnf(clause_7, axiom)
$k = \mathrm{critical\_point}(t)$ cnf(clause_8, axiom)
$\mathrm{sk} = f(s, k)$ cnf(clause_9, axiom)
$\mathrm{stk} = f(\mathrm{st}, k)$ cnf(clause_{10}, axiom)
$\mathrm{less}(k, \mathrm{sk})$ cnf(clause_{11}, hypothesis)
$\neg\,\mathrm{less}(f(f(f(\mathrm{stts}, \mathrm{sttt}), \mathrm{stts}), f(f(\mathrm{stts}, \mathrm{sttt}), k)), f(\mathrm{stt}, \mathrm{sk}))$ cnf(prove_equation, negated_conjecture)

LDA012-1.p Let g = cr(t). Show that stts(sttt)g = g
include('Axioms/LDA001-0.ax')
$\mathrm{st} = f(s, t)$ cnf(clause_1, axiom)
$\mathrm{stt} = f(\mathrm{st}, t)$ cnf(clause_2, axiom)
$\mathrm{sttt} = f(\mathrm{stt}, t)$ cnf(clause_3, axiom)
$\mathrm{stts} = f(\mathrm{stt}, s)$ cnf(clause_4, axiom)
$\mathrm{ts} = f(t, s)$ cnf(clause_5, axiom)
$\mathrm{sts} = f(\mathrm{st}, s)$ cnf(clause_6, axiom)
$\mathrm{st\_ts} = f(\mathrm{st}, \mathrm{ts})$ cnf(clause_7, axiom)
$k = \mathrm{critical\_point}(t)$ cnf(clause_8, axiom)
$\mathrm{sk} = f(s, k)$ cnf(clause_9, axiom)
$\mathrm{stk} = f(\mathrm{st}, k)$ cnf(clause_{10}, axiom)
$\mathrm{less}(k, \mathrm{sk})$ cnf(clause_{11}, hypothesis)
$f(f(\mathrm{stts}, \mathrm{sttt}), k) \neq k$ cnf(prove_equation, negated_conjecture)

LDA012-2.p Let g = cr(t). Show that stts(sttt)g = g
$f(x, f(y, z)) = f(f(x, y), f(x, z))$ cnf(a_1, axiom)
$a(x, a(y, z)) = a(f(x, y), a(x, z))$ cnf(a1a, axiom)
$\mathrm{critical\_point}(f(u, v)) = a(u, \mathrm{critical\_point}(v))$ cnf(a_2, axiom)
$\neg\,\mathrm{less}(x, x)$ cnf(b_1, axiom)
$\mathrm{less}(x, y) \Rightarrow \mathrm{less}(a(u, x), a(u, y))$ cnf(b_4, axiom)
$x = a(u, x)$ or $\mathrm{less}(x, a(u, x))$ cnf(c_1, axiom)
$\mathrm{less}(x, \mathrm{critical\_point}(u)) \Rightarrow a(u, x) = x$ cnf(c_2, axiom)
$\mathrm{less}(x, \mathrm{critical\_point}(u))$ or $\mathrm{less}(x, a(u, x))$ cnf(c_3, axiom)
$a(u, x) = x \Rightarrow a(f(v, u), x) = x$ cnf(d_2, axiom)
$\mathrm{stt} = f(\mathrm{st}, t)$ cnf(clause_2, axiom)
$\mathrm{sttt} = f(\mathrm{stt}, t)$ cnf(clause_3, axiom)
$\mathrm{stts} = f(\mathrm{stt}, s)$ cnf(clause_4, axiom)
$\mathrm{ts} = f(t, s)$ cnf(clause_5, axiom)
$\mathrm{sts} = f(\mathrm{st}, s)$ cnf(clause_6, axiom)
$\mathrm{st\_ts} = f(\mathrm{st}, \mathrm{ts})$ cnf(clause_7, axiom)
$k = \mathrm{critical\_point}(t)$ cnf(clause_8, axiom)
$\mathrm{sk} = f(s, k)$ cnf(clause_9, axiom)
$\mathrm{stk} = f(\mathrm{st}, k)$ cnf(clause_{10}, axiom)
$\mathrm{less}(k, \mathrm{sk})$ cnf(clause_{11}, hypothesis)
$f(f(\mathrm{stts}, \mathrm{sttt}), k) \neq k$ cnf(prove_equation, negated_conjecture)

LDA013-1.p Let g = cr(t). Show that aag ≤ ag, t=a
This is the base step of an induction proof.
include('Axioms/LDA001-0.ax')
$k = \mathrm{critical\_point}(\mathrm{aconst})$ cnf(clause_1, axiom)
$\mathrm{aa} = f(\mathrm{aconst}, \mathrm{aconst})$ cnf(clause_2, axiom)
$\mathrm{aak} = f(\mathrm{aa}, k)$ cnf(clause_3, axiom)
$\mathrm{ak} = f(\mathrm{aconst}, k)$ cnf(clause_4, axiom)
$\mathrm{less}(\mathrm{ak}, \mathrm{aak})$ cnf(prove_equation, negated_conjecture)

LDA014-1.p Let g = cr(t). Show that aag ≤ ag, t=a
This is the induction step of an induction proof.
include('Axioms/LDA001-0.ax')

$k = \text{critical\_point}(\text{aconst})$ cnf(clause_1, axiom)
$\text{aa} = f(\text{aconst}, \text{aconst})$ cnf(clause_2, axiom)
$\text{aak} = f(\text{aa}, k)$ cnf(clause_3, axiom)
$\text{ak} = f(\text{aconst}, k)$ cnf(clause_4, axiom)
$\text{crit\_u} = \text{critical\_point}(u)$ cnf(clause_5, axiom)
$\text{aacrit\_u} = f(\text{aa}, \text{crit\_u})$ cnf(clause_6, axiom)
$\text{acrit\_u} = f(\text{aconst}, \text{crit\_u})$ cnf(clause_7, axiom)
$\text{crit\_v} = \text{critical\_point}(v)$ cnf(clause_8, axiom)
$\text{aacrit\_v} = f(\text{aa}, \text{crit\_v})$ cnf(clause_9, axiom)
$\text{acrit\_v} = f(\text{aconst}, \text{crit\_v})$ cnf(clause_{10}, axiom)
$\text{uv} = f(u, v)$ cnf(clause_{11}, axiom)
$\text{crit\_uv} = \text{critical\_point}(\text{uv})$ cnf(clause_{12}, axiom)
$\text{aacrit\_uv} = f(\text{aa}, \text{crit\_uv})$ cnf(clause_{13}, axiom)
$\text{acrit\_uv} = f(\text{aconst}, \text{crit\_uv})$ cnf(clause_{14}, axiom)
$\neg\,\text{less}(\text{acrit\_u}, \text{aacrit\_u})$ cnf(true_for_u, hypothesis)
$\neg\,\text{less}(\text{acrit\_v}, \text{aacrit\_v})$ cnf(true_for_v, hypothesis)
$\text{less}(\text{acrit\_uv}, \text{aacrit\_uv})$ cnf(prove_equation, negated_conjecture)

LDA015-1.p Identity 00 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot c) \cdot c) \cdot (((a \cdot b) \cdot b) \cdot ((a \cdot b) \cdot d)) = ((a \cdot b) \cdot c) \cdot (((c \cdot a) \cdot (c \cdot b)) \cdot (b \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA016-1.p Identity 01 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$((a \cdot b) \cdot (c \cdot a)) \cdot (((a \cdot b) \cdot (a \cdot c)) \cdot (c \cdot d)) = ((a \cdot b) \cdot ((c \cdot a) \cdot a)) \cdot (((a \cdot b) \cdot c) \cdot (c \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA017-1.p Identity 03 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$((a \cdot b) \cdot ((a \cdot c) \cdot c)) \cdot (a \cdot ((b \cdot a) \cdot d)) = ((a \cdot b) \cdot (a \cdot c)) \cdot (((a \cdot b) \cdot (c \cdot a)) \cdot (a \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA018-1.p Identity 04 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot (a \cdot c)) \cdot (b \cdot c)) \cdot (a \cdot ((a \cdot b) \cdot d)) = ((a \cdot b) \cdot (a \cdot c)) \cdot (((b \cdot c) \cdot a) \cdot ((a \cdot b) \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA019-1.p Identity 06 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot c) \cdot c) \cdot ((a \cdot b) \cdot (a \cdot (a \cdot d))) = ((a \cdot b) \cdot c) \cdot (((c \cdot a) \cdot (c \cdot b)) \cdot (a \cdot (a \cdot d)))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA020-1.p Identity 07 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$((a \cdot b) \cdot c) \cdot (((c \cdot a) \cdot (c \cdot b)) \cdot (a \cdot (a \cdot d))) = (((a \cdot b) \cdot c) \cdot c) \cdot (a \cdot (b \cdot (a \cdot d)))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA021-1.p Identity 08 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)

$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot (a \cdot c)) \cdot (a \cdot c)) \cdot (((a \cdot b) \cdot b) \cdot ((a \cdot b) \cdot d)) = ((a \cdot b) \cdot (a \cdot c)) \cdot ((a \cdot (c \cdot b)) \cdot (b \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA022-1.p Identity 10 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot (a \cdot c)) \cdot (a \cdot c)) \cdot ((a \cdot b) \cdot (a \cdot (a \cdot d))) = ((a \cdot b) \cdot (a \cdot c)) \cdot ((a \cdot (c \cdot b)) \cdot (a \cdot (a \cdot d)))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA023-1.p Identity 11 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$((a \cdot b) \cdot (a \cdot c)) \cdot ((a \cdot (c \cdot b)) \cdot (a \cdot (a \cdot d))) = (((a \cdot b) \cdot (a \cdot c)) \cdot (a \cdot c)) \cdot (a \cdot (b \cdot (a \cdot d)))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA024-1.p Identity 12 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot c) \cdot c) \cdot ((a \cdot b) \cdot ((a \cdot d) \cdot d)) = ((a \cdot b) \cdot c) \cdot (((c \cdot a) \cdot (c \cdot b)) \cdot ((a \cdot d) \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA025-1.p Identity 13 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$((a \cdot b) \cdot c) \cdot (((c \cdot a) \cdot (c \cdot b)) \cdot ((a \cdot d) \cdot d)) = (((a \cdot b) \cdot c) \cdot c) \cdot (((a \cdot b) \cdot (a \cdot d)) \cdot ((a \cdot b) \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA026-1.p Identity 14 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot (a \cdot c)) \cdot (a \cdot c)) \cdot ((a \cdot b) \cdot ((a \cdot d) \cdot d)) = ((a \cdot b) \cdot (a \cdot c)) \cdot ((a \cdot (c \cdot b)) \cdot ((a \cdot d) \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA027-1.p Identity 17 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$((a \cdot b) \cdot ((a \cdot c) \cdot c)) \cdot (((a \cdot b) \cdot a) \cdot (b \cdot d)) = ((a \cdot b) \cdot (a \cdot c)) \cdot (((a \cdot b) \cdot (c \cdot a)) \cdot (b \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA028-1.p Identity 19 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot c) \cdot c) \cdot (((a \cdot b) \cdot a) \cdot ((a \cdot b) \cdot d)) = ((a \cdot b) \cdot c) \cdot (((c \cdot a) \cdot (c \cdot b)) \cdot (a \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA029-1.p Identity 21 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot (a \cdot c)) \cdot (b \cdot c)) \cdot (a \cdot ((a \cdot c) \cdot d)) = ((a \cdot b) \cdot (a \cdot c)) \cdot (((b \cdot c) \cdot a) \cdot ((a \cdot c) \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA030-1.p Identity 24 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot (a \cdot c)) \cdot (b \cdot c)) \cdot (a \cdot ((b \cdot a) \cdot d)) = ((a \cdot b) \cdot (a \cdot c)) \cdot (((b \cdot c) \cdot a) \cdot ((b \cdot a) \cdot d))$ cnf(sos_{04}, axiom)

$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA031-1.p Identity 25 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot c) \cdot c) \cdot (((a \cdot b) \cdot b) \cdot (a \cdot d)) = ((a \cdot b) \cdot c) \cdot (((c \cdot a) \cdot (c \cdot b)) \cdot ((b \cdot a) \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA032-1.p Identity 26 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot (a \cdot c)) \cdot (a \cdot c)) \cdot ((a \cdot b) \cdot ((a \cdot d) \cdot d)) = ((a \cdot b) \cdot (a \cdot c)) \cdot ((a \cdot (c \cdot b)) \cdot ((a \cdot d) \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA033-1.p Identity 29 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$((a \cdot b) \cdot ((a \cdot c) \cdot c)) \cdot (((a \cdot b) \cdot a) \cdot (b \cdot d)) = ((a \cdot b) \cdot (a \cdot c)) \cdot (((a \cdot b) \cdot (c \cdot a)) \cdot (b \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA034-1.p Identity 30 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$((a \cdot b) \cdot (c \cdot a)) \cdot (((a \cdot b) \cdot (a \cdot c)) \cdot (c \cdot d)) = ((a \cdot b) \cdot ((c \cdot a) \cdot a)) \cdot (((a \cdot b) \cdot c) \cdot (c \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA035-1.p Identity 32 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$((a \cdot b) \cdot ((a \cdot c) \cdot c)) \cdot (a \cdot ((b \cdot a) \cdot d)) = ((a \cdot b) \cdot (a \cdot c)) \cdot (((a \cdot b) \cdot (c \cdot a)) \cdot (a \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA036-1.p Identity 33 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$((a \cdot b) \cdot ((a \cdot c) \cdot c)) \cdot (((a \cdot b) \cdot a) \cdot ((b \cdot a) \cdot d)) = ((a \cdot b) \cdot (a \cdot c)) \cdot (((a \cdot b) \cdot (c \cdot a)) \cdot ((b \cdot a) \cdot d))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA037-1.p Identity 34 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$(((a \cdot b) \cdot c) \cdot c) \cdot ((a \cdot b) \cdot (a \cdot (a \cdot d))) = ((a \cdot b) \cdot c) \cdot (((c \cdot a) \cdot (c \cdot b)) \cdot (a \cdot (a \cdot d)))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA038-1.p Identity 35 in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot (b \cdot a)) \cdot ((b \cdot a) \cdot a)) \cdot ((a \cdot b) \cdot c) = ((a \cdot (b \cdot a)) \cdot (b \cdot a)) \cdot ((a \cdot (a \cdot b)) \cdot c)$ cnf(sos_{03}, axiom)
$((a \cdot b) \cdot c) \cdot (((c \cdot a) \cdot (c \cdot b)) \cdot (a \cdot (a \cdot d))) = (((a \cdot b) \cdot c) \cdot c) \cdot (a \cdot (b \cdot (a \cdot d)))$ cnf(sos_{04}, axiom)
$((x_0 \cdot x_1) \cdot x_1) \cdot (x_0 \cdot x_2) \neq (x_0 \cdot x_1) \cdot ((x_1 \cdot x_0) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA039-1.p Identity xx in the equational theory of group conjugation
$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$(a \cdot (b \cdot a)) \cdot ((b \cdot (a \cdot b)) \cdot ((c \cdot b) \cdot a)) = ((a \cdot (b \cdot a)) \cdot b) \cdot (a \cdot ((c \cdot b) \cdot a))$ cnf(sos_{03}, axiom)
$(x_0 \cdot (x_1 \cdot x_0)) \cdot ((x_1 \cdot (x_0 \cdot x_1)) \cdot (x_2 \cdot x_0)) \neq ((x_0 \cdot (x_1 \cdot x_0)) \cdot x_1) \cdot (x_0 \cdot (x_2 \cdot x_0))$ cnf(goals, negated_conjecture)

LDA040-1.p Identity yy in the equational theory of group conjugation

$a \cdot a = a$ cnf(sos_{01}, axiom)
$a \cdot (b \cdot c) = (a \cdot b) \cdot (a \cdot c)$ cnf(sos_{02}, axiom)
$((a \cdot b) \cdot ((c \cdot a) \cdot a)) \cdot (((a \cdot b) \cdot c) \cdot ((c \cdot a) \cdot d)) = ((a \cdot b) \cdot (c \cdot a)) \cdot (((a \cdot b) \cdot (a \cdot c)) \cdot ((c \cdot a) \cdot d))$ cnf(sos_{03}, axiom)
$((x_0 \cdot (x_1 \cdot x_0)) \cdot ((x_1 \cdot x_0) \cdot x_0)) \cdot ((x_0 \cdot x_1) \cdot x_2) \neq ((x_0 \cdot (x_1 \cdot x_0)) \cdot (x_1 \cdot x_0)) \cdot ((x_0 \cdot (x_0 \cdot x_1)) \cdot x_2)$ cnf(goals, negated_conjecture)

LDA041-1.p Embedding algebra
include('Axioms/LDA001-0.ax')