

1 Active Clauses

- (C9) $\vdash m_0 + (((k * (l_0 + (\mathbf{1} + \mathbf{1}))) + (l_0 * (m_0 + \mathbf{1}))) + \mathbf{1}) = k + ((k + (m_0 + \mathbf{1})) * (l_0 + \mathbf{1}))$
- (C32) $m_0 = k_0 + (r_0 * ((t_0 + \mathbf{1}) * (t_1 + \mathbf{1}))) \vdash m_0 = k_0 + ((r_0 * (t_0 + \mathbf{1})) * (t_1 + \mathbf{1}))$
(subsumes 1 clause)
- (C34) $m_0 = k_0 + (r_0 * ((t_0 + \mathbf{1}) * (t_1 + \mathbf{1}))) \vdash m_0 = k_0 + ((r_0 * (t_1 + \mathbf{1})) * (t_0 + \mathbf{1}))$
(subsumes 1 clause)
- (C35) $\vdash (((t_0 + \mathbf{1}) * t_1) + t_0) + \mathbf{1} = (t_0 + \mathbf{1}) * (t_1 + \mathbf{1})$ (subsumes 1 clause)
- (C51) $\mathbf{0} < \mathbf{p}_0 \vdash \mathbf{p}_0 = s_7(\mathbf{p}_0) + \mathbf{1}$
- (C52) $\mathbf{0} < \mathbf{p}_0 \vdash t_0 = s_5(\mathbf{p}_0, t_0) + (s_6(\mathbf{p}_0, t_0) * \mathbf{p}_0)$
- (C53) $\mathbf{0} < \mathbf{p}_0, s_5(\mathbf{p}_0, t_0) = \mathbf{0} \vdash t_0 = \mathbf{0} + (s_6(\mathbf{p}_0, t_0) * \mathbf{p}_0)$
- (C54) $\mathbf{0} < \mathbf{p}_0 \vdash s_5(\mathbf{p}_0, t_0) < \mathbf{p}_0$
- (C68) $\mathbf{0} < \mathbf{p}_1 \vdash \mathbf{p}_1 = s_7(\mathbf{p}_1) + \mathbf{1}$
- (C69) $\mathbf{0} < \mathbf{p}_1 \vdash t_0 = s_5(\mathbf{p}_1, t_0) + (s_6(\mathbf{p}_1, t_0) * \mathbf{p}_1)$
- (C70) $\mathbf{0} < \mathbf{p}_1, s_5(\mathbf{p}_1, t_0) = \mathbf{0} \vdash t_0 = \mathbf{0} + (s_6(\mathbf{p}_1, t_0) * \mathbf{p}_1)$
- (C71) $\mathbf{0} < \mathbf{p}_1 \vdash s_5(\mathbf{p}_1, t_0) < \mathbf{p}_1$
- (C85) $\mathbf{0} < \mathbf{p}_2 \vdash \mathbf{p}_2 = s_7(\mathbf{p}_2) + \mathbf{1}$
- (C86) $\mathbf{0} < \mathbf{p}_2 \vdash t_0 = s_5(\mathbf{p}_2, t_0) + (s_6(\mathbf{p}_2, t_0) * \mathbf{p}_2)$
- (C87) $\mathbf{0} < \mathbf{p}_2, s_5(\mathbf{p}_2, t_0) = \mathbf{0} \vdash t_0 = \mathbf{0} + (s_6(\mathbf{p}_2, t_0) * \mathbf{p}_2)$
- (C88) $\mathbf{0} < \mathbf{p}_2 \vdash s_5(\mathbf{p}_2, t_0) < \mathbf{p}_2$
- (C122) $t_0 = \mathbf{p}_2, nat_{23} * nat_{24} = t_0 \vdash nat_{23} = \mathbf{1}, nat_{23} = t_0$
- (C123) $t_0 = \mathbf{p}_2 \vdash \mathbf{1} < t_0$
- (C124) $t_0 = \mathbf{p}_1, nat_{23} * nat_{24} = t_0 \vdash nat_{23} = \mathbf{1}, nat_{23} = t_0$
- (C125) $t_0 = \mathbf{p}_1 \vdash \mathbf{1} < t_0$
- (C126) $t_0 = \mathbf{p}_0, nat_{23} * nat_{24} = t_0 \vdash nat_{23} = \mathbf{1}, nat_{23} = t_0$
- (C127) $t_0 = \mathbf{p}_0 \vdash \mathbf{1} < t_0$
- (C135) $\vdash m_0 = \mathbf{1}, s_1(m_0) * s_4(m_0) = m_0$
- (C138) $\vdash m_0 = \mathbf{1}, s_1(m_0) = \mathbf{p}_0, s_1(m_0) = \mathbf{p}_1, s_1(m_0) = \mathbf{p}_2$
- (C141) $t_0 = \mathbf{p}_2, \mathbf{1} = n_0 * t_0 \vdash$
- (C144) $t_0 = \mathbf{p}_1, \mathbf{1} = n_0 * t_0 \vdash$
- (C147) $t_0 = \mathbf{p}_0, \mathbf{1} = n_0 * t_0 \vdash$

2 Subsumed

- (C1) $\mathbf{1} + (l_0 + \mathbf{1}) = \mathbf{1} \vdash$ by (A13)
- (C17) $m_0 = k_0 + (r_0 * ((t_0 + \mathbf{1}) * (t_1 + \mathbf{1}))) \vdash m_0 = k_0 + ((r_0 * (t_0 + \mathbf{1})) * (t_1 + \mathbf{1}))$
by (C32)
- (C20) $m_0 = k_0 + (r_0 * ((t_0 + \mathbf{1}) * (t_1 + \mathbf{1}))) \vdash m_0 = k_0 + ((r_0 * (t_1 + \mathbf{1})) * (t_0 + \mathbf{1}))$
by (C34)
- (C21) $\vdash (((t_0 + \mathbf{1}) * t_1) + t_0) + \mathbf{1} = (t_0 + \mathbf{1}) * (t_1 + \mathbf{1})$ by (C35)
- (C46) $\mathbf{0} < \mathbf{p}_0 \vdash (q_0 * \mathbf{p}_0) + (r_0 * \mathbf{p}_0) = (q_0 + r_0) * \mathbf{p}_0$ by (A23)
- (C47) $\mathbf{0} < \mathbf{p}_0 \vdash (i_0 + (q_0 * \mathbf{p}_0)) + (r_0 * \mathbf{p}_0) = i_0 + ((q_0 * \mathbf{p}_0) + (r_0 * \mathbf{p}_0))$ by (A3)
- (C55) $\mathbf{0} < i_0, \mathbf{0} < \mathbf{p}_0, i_0 < \mathbf{p}_0, i_0 + (q_0 * \mathbf{p}_0) = \mathbf{0} + (r_0 * \mathbf{p}_0) \vdash$ by (A29)
- (C56) $i_0 < \mathbf{0}, \mathbf{0} < \mathbf{p}_0, i_0 < \mathbf{p}_0, i_0 + (q_0 * \mathbf{p}_0) = \mathbf{0} + (r_0 * \mathbf{p}_0) \vdash$ by (A27)
- (C57) $\vdash i_0 = \mathbf{0}, i_0 < \mathbf{0}, \mathbf{0} < i_0$ by (A30)
- (C59) $\mathbf{0} + \mathbf{1} < \mathbf{p}_0 \vdash \mathbf{0} < \mathbf{p}_0$ by (A32)
- (C60) $\vdash \mathbf{0} + \mathbf{1} = \mathbf{1}$ by (A6)
- (C63) $\mathbf{0} < \mathbf{p}_1 \vdash (q_0 * \mathbf{p}_1) + (r_0 * \mathbf{p}_1) = (q_0 + r_0) * \mathbf{p}_1$ by (A23)
- (C64) $\mathbf{0} < \mathbf{p}_1 \vdash (i_0 + (q_0 * \mathbf{p}_1)) + (r_0 * \mathbf{p}_1) = i_0 + ((q_0 * \mathbf{p}_1) + (r_0 * \mathbf{p}_1))$ by (A3)
- (C72) $\mathbf{0} < i_0, \mathbf{0} < \mathbf{p}_1, i_0 < \mathbf{p}_1, i_0 + (q_0 * \mathbf{p}_1) = \mathbf{0} + (r_0 * \mathbf{p}_1) \vdash$ by (A29)
- (C73) $i_0 < \mathbf{0}, \mathbf{0} < \mathbf{p}_1, i_0 < \mathbf{p}_1, i_0 + (q_0 * \mathbf{p}_1) = \mathbf{0} + (r_0 * \mathbf{p}_1) \vdash$ by (A27)
- (C74) $\vdash i_0 = \mathbf{0}, i_0 < \mathbf{0}, \mathbf{0} < i_0$ by (A30)
- (C76) $\mathbf{0} + \mathbf{1} < \mathbf{p}_1 \vdash \mathbf{0} < \mathbf{p}_1$ by (A32)
- (C77) $\vdash \mathbf{0} + \mathbf{1} = \mathbf{1}$ by (A6)
- (C80) $\mathbf{0} < \mathbf{p}_2 \vdash (q_0 * \mathbf{p}_2) + (r_0 * \mathbf{p}_2) = (q_0 + r_0) * \mathbf{p}_2$ by (A23)
- (C81) $\mathbf{0} < \mathbf{p}_2 \vdash (i_0 + (q_0 * \mathbf{p}_2)) + (r_0 * \mathbf{p}_2) = i_0 + ((q_0 * \mathbf{p}_2) + (r_0 * \mathbf{p}_2))$ by (A3)
- (C89) $\mathbf{0} < i_0, \mathbf{0} < \mathbf{p}_2, i_0 < \mathbf{p}_2, i_0 + (q_0 * \mathbf{p}_2) = \mathbf{0} + (r_0 * \mathbf{p}_2) \vdash$ by (A29)
- (C90) $i_0 < \mathbf{0}, \mathbf{0} < \mathbf{p}_2, i_0 < \mathbf{p}_2, i_0 + (q_0 * \mathbf{p}_2) = \mathbf{0} + (r_0 * \mathbf{p}_2) \vdash$ by (A27)
- (C91) $\vdash i_0 = \mathbf{0}, i_0 < \mathbf{0}, \mathbf{0} < i_0$ by (A30)
- (C93) $\mathbf{0} + \mathbf{1} < \mathbf{p}_2 \vdash \mathbf{0} < \mathbf{p}_2$ by (A32)
- (C94) $\vdash \mathbf{0} + \mathbf{1} = \mathbf{1}$ by (A6)
- (C136) $\vdash m_0 = \mathbf{1}, s_4(m_0) * s_1(m_0) = s_1(m_0) * s_4(m_0)$ by (A14)
- (C137) $\vdash m_0 = \mathbf{1}, \mathbf{0} + (s_4(m_0) * s_1(m_0)) = s_4(m_0) * s_1(m_0)$ by (A6)
- (C143) $t_0 = \mathbf{p}_2 \vdash \mathbf{0} + (n_0 * t_0) = n_0 * t_0$ by (A6)
- (C146) $t_0 = \mathbf{p}_1 \vdash \mathbf{0} + (n_0 * t_0) = n_0 * t_0$ by (A6)
- (C149) $t_0 = \mathbf{p}_0 \vdash \mathbf{0} + (n_0 * t_0) = n_0 * t_0$ by (A6)

3 Clauses with Tautologies

$$(C2) \text{ nat}_2 + (\text{nat}_3 + \mathbf{1}) = \mathbf{1} \vdash \text{nat}_2 + (\text{nat}_3 + \mathbf{1}) = \mathbf{1}$$

$$(C3) \text{ nat}_4 = \mathbf{1} \vdash \text{nat}_4 = \mathbf{1}$$

$$(C4) \text{ nat}_7 = \mathbf{1} \vdash \text{nat}_7 = \mathbf{1}$$

$$(C5) \text{ nat}_7 = \text{nat}_5 + (\text{nat}_8 * (\text{nat}_6 + \mathbf{1})) \vdash \text{nat}_7 = \text{nat}_5 + (\text{nat}_8 * (\text{nat}_6 + \mathbf{1}))$$

$$(C6) \text{ nat}_5 = \mathbf{1} \vdash \text{nat}_5 = \mathbf{1}$$

$$(C7) m_0 + (n_0 + \mathbf{1}) \in x \vdash m_0 + (n_0 + \mathbf{1}) \in x$$

$$(C8) m_0 + (n_0 + \mathbf{1}) = k + (\text{nat}_1 * (l_0 + \mathbf{1})) \vdash m_0 + (n_0 + \mathbf{1}) = k + (\text{nat}_1 * (l_0 + \mathbf{1}))$$

$$(C10) k \in x \vdash k \in x$$

$$(C11) \text{ nat}_{11} = \mathbf{1} \vdash \text{nat}_{11} = \mathbf{1}$$

$$(C12) \text{ nat}_{11} = \text{nat}_9 + (\text{nat}_{12} * (\text{nat}_{10} + \mathbf{1})) \vdash \text{nat}_{11} = \text{nat}_9 + (\text{nat}_{12} * (\text{nat}_{10} + \mathbf{1}))$$

$$(C13) \text{ nat}_9 = \mathbf{1} \vdash \text{nat}_9 = \mathbf{1}$$

$$(C14) n_0 = \mathbf{1} \vdash n_0 = \mathbf{1}$$

$$(C15) n_0 = \mathbf{1} \vdash n_0 = \mathbf{1}$$

$$(C16) m_0 = \mathbf{0} + (\text{nat}_{66} * \mathbf{p}_2) \vdash m_0 = \mathbf{0} + (\text{nat}_{66} * \mathbf{p}_2)$$

$$(C18) m_0 = \mathbf{0} + (\text{nat}_{65} * \mathbf{p}_1) \vdash m_0 = \mathbf{0} + (\text{nat}_{65} * \mathbf{p}_1)$$

$$(C19) m_0 = \mathbf{0} + (\text{nat}_{64} * \mathbf{p}_0) \vdash m_0 = \mathbf{0} + (\text{nat}_{64} * \mathbf{p}_0)$$

$$(C22) k_0 = \mathbf{0} + (\text{nat}_{63} * \mathbf{p}_2) \vdash k_0 = \mathbf{0} + (\text{nat}_{63} * \mathbf{p}_2)$$

$$(C23) k_0 = \mathbf{0} + (\text{nat}_{62} * \mathbf{p}_1) \vdash k_0 = \mathbf{0} + (\text{nat}_{62} * \mathbf{p}_1)$$

$$(C24) k_0 = \mathbf{0} + (\text{nat}_{61} * \mathbf{p}_0) \vdash k_0 = \mathbf{0} + (\text{nat}_{61} * \mathbf{p}_0)$$

$$(C25) n_0 = \mathbf{0} + (\text{nat}_{58} * \mathbf{p}_2) \vdash n_0 = \mathbf{0} + (\text{nat}_{58} * \mathbf{p}_2)$$

$$(C26) n_0 = \mathbf{0} + (\text{nat}_{60} * \mathbf{p}_1) \vdash n_0 = \mathbf{0} + (\text{nat}_{60} * \mathbf{p}_1)$$

$$(C27) n_0 = \mathbf{0} + (\text{nat}_{59} * \mathbf{p}_0) \vdash n_0 = \mathbf{0} + (\text{nat}_{59} * \mathbf{p}_0)$$

$$(C28) n_0 = \mathbf{0} + (\text{nat}_{55} * \mathbf{p}_2) \vdash n_0 = \mathbf{0} + (\text{nat}_{55} * \mathbf{p}_2)$$

$$(C29) n_0 = \mathbf{0} + (\text{nat}_{57} * \mathbf{p}_1) \vdash n_0 = \mathbf{0} + (\text{nat}_{57} * \mathbf{p}_1)$$

$$(C30) n_0 = \mathbf{0} + (\text{nat}_{56} * \mathbf{p}_0) \vdash n_0 = \mathbf{0} + (\text{nat}_{56} * \mathbf{p}_0)$$

$$(C31) m_0 = \mathbf{0} + (\text{nat}_{54} * \mathbf{p}_1) \vdash m_0 = \mathbf{0} + (\text{nat}_{54} * \mathbf{p}_1)$$

$$(C33) m_0 = \mathbf{0} + (\text{nat}_{53} * \mathbf{p}_0) \vdash m_0 = \mathbf{0} + (\text{nat}_{53} * \mathbf{p}_0)$$

$$(C36) k_0 = \mathbf{0} + (\text{nat}_{52} * \mathbf{p}_1) \vdash k_0 = \mathbf{0} + (\text{nat}_{52} * \mathbf{p}_1)$$

$$(C37) k_0 = \mathbf{0} + (\text{nat}_{51} * \mathbf{p}_0) \vdash k_0 = \mathbf{0} + (\text{nat}_{51} * \mathbf{p}_0)$$

- (C38) $n_0 = \mathbf{0} + (\text{nat}_{50} * \mathbf{p}_1) \vdash n_0 = \mathbf{0} + (\text{nat}_{50} * \mathbf{p}_1)$
- (C39) $n_0 = \mathbf{0} + (\text{nat}_{49} * \mathbf{p}_0) \vdash n_0 = \mathbf{0} + (\text{nat}_{49} * \mathbf{p}_0)$
- (C40) $n_0 = \mathbf{0} + (\text{nat}_{47} * \mathbf{p}_1) \vdash n_0 = \mathbf{0} + (\text{nat}_{47} * \mathbf{p}_1)$
- (C41) $n_0 = \mathbf{0} + (\text{nat}_{48} * \mathbf{p}_0) \vdash n_0 = \mathbf{0} + (\text{nat}_{48} * \mathbf{p}_0)$
- (C42) $\text{nat}_{44} = \mathbf{0} + (\text{nat}_{46} * \mathbf{p}_0) \vdash \text{nat}_{44} = \mathbf{0} + (\text{nat}_{46} * \mathbf{p}_0)$
- (C43) $\text{nat}_{44} = \text{nat}_{41} + (\text{nat}_{45} * (\text{nat}_{43} + \mathbf{1})) \vdash \text{nat}_{44} = \text{nat}_{41} + (\text{nat}_{45} * (\text{nat}_{43} + \mathbf{1}))$
- (C44) $\text{nat}_{41} = \mathbf{0} + (\text{nat}_{42} * \mathbf{p}_0) \vdash \text{nat}_{41} = \mathbf{0} + (\text{nat}_{42} * \mathbf{p}_0)$
- (C45) $\mathbf{0} < \mathbf{p}_0, t_0 = i_0 + ((q_0 + r_0) * \mathbf{p}_0) \vdash t_0 = i_0 + ((q_0 + r_0) * \mathbf{p}_0)$
- (C48) $\mathbf{0} < \mathbf{p}_0, m_0 = i_0 + (q_0 * \mathbf{p}_0) \vdash m_0 = i_0 + (q_0 * \mathbf{p}_0)$
- (C49) $\mathbf{0} < \mathbf{p}_0, i_0 = \mathbf{0} \vdash i_0 = \mathbf{0}$
- (C50) $\mathbf{0} < \mathbf{p}_0, i_0 < \mathbf{p}_0 \vdash i_0 < \mathbf{p}_0$
- (C58) $t_0 = i_0 + (q_0 * \mathbf{p}_0) \vdash t_0 = i_0 + (q_0 * \mathbf{p}_0)$
- (C61) $\mathbf{1} < \mathbf{p}_0 \vdash \mathbf{1} < \mathbf{p}_0$
- (C62) $\mathbf{0} < \mathbf{p}_1, t_0 = i_0 + ((q_0 + r_0) * \mathbf{p}_1) \vdash t_0 = i_0 + ((q_0 + r_0) * \mathbf{p}_1)$
- (C65) $\mathbf{0} < \mathbf{p}_1, m_0 = i_0 + (q_0 * \mathbf{p}_1) \vdash m_0 = i_0 + (q_0 * \mathbf{p}_1)$
- (C66) $\mathbf{0} < \mathbf{p}_1, i_0 = \mathbf{0} \vdash i_0 = \mathbf{0}$
- (C67) $\mathbf{0} < \mathbf{p}_1, i_0 < \mathbf{p}_1 \vdash i_0 < \mathbf{p}_1$
- (C75) $t_0 = i_0 + (q_0 * \mathbf{p}_1) \vdash t_0 = i_0 + (q_0 * \mathbf{p}_1)$
- (C78) $\mathbf{1} < \mathbf{p}_1 \vdash \mathbf{1} < \mathbf{p}_1$
- (C79) $\mathbf{0} < \mathbf{p}_2, t_0 = i_0 + ((q_0 + r_0) * \mathbf{p}_2) \vdash t_0 = i_0 + ((q_0 + r_0) * \mathbf{p}_2)$
- (C82) $\mathbf{0} < \mathbf{p}_2, m_0 = i_0 + (q_0 * \mathbf{p}_2) \vdash m_0 = i_0 + (q_0 * \mathbf{p}_2)$
- (C83) $\mathbf{0} < \mathbf{p}_2, i_0 = \mathbf{0} \vdash i_0 = \mathbf{0}$
- (C84) $\mathbf{0} < \mathbf{p}_2, i_0 < \mathbf{p}_2 \vdash i_0 < \mathbf{p}_2$
- (C92) $t_0 = i_0 + (q_0 * \mathbf{p}_2) \vdash t_0 = i_0 + (q_0 * \mathbf{p}_2)$
- (C95) $\mathbf{1} < \mathbf{p}_2 \vdash \mathbf{1} < \mathbf{p}_2$
- (C96) $\text{nat}_{33} = \mathbf{p}_2 \vdash \text{nat}_{33} = \mathbf{p}_2$
- (C97) $\text{nat}_{33} = \mathbf{1} \vdash \text{nat}_{33} = \mathbf{1}$
- (C98) $\text{nat}_{33} * \text{nat}_{34} = \mathbf{p}_2 \vdash \text{nat}_{33} * \text{nat}_{34} = \mathbf{p}_2$
- (C99) $\mathbf{1} < \mathbf{p}_2 \vdash \mathbf{1} < \mathbf{p}_2$
- (C101) $\text{nat}_{31} = \mathbf{p}_1 \vdash \text{nat}_{31} = \mathbf{p}_1$

- (C102) $nat_{31} = \mathbf{1} \vdash nat_{31} = \mathbf{1}$
- (C103) $nat_{31} * nat_{32} = \mathbf{p}_1 \vdash nat_{31} * nat_{32} = \mathbf{p}_1$
- (C104) $\mathbf{1} < \mathbf{p}_1 \vdash \mathbf{1} < \mathbf{p}_1$
- (C106) $nat_{29} = \mathbf{p}_0 \vdash nat_{29} = \mathbf{p}_0$
- (C107) $nat_{29} = \mathbf{1} \vdash nat_{29} = \mathbf{1}$
- (C108) $nat_{29} * nat_{30} = \mathbf{p}_0 \vdash nat_{29} * nat_{30} = \mathbf{p}_0$
- (C109) $\mathbf{1} < \mathbf{p}_0 \vdash \mathbf{1} < \mathbf{p}_0$
- (C111) $nat_{27} = t_0 \vdash nat_{27} = t_0$
- (C112) $nat_{27} = \mathbf{1} \vdash nat_{27} = \mathbf{1}$
- (C113) $nat_{27} * nat_{28} = t_0 \vdash nat_{27} * nat_{28} = t_0$
- (C114) $\mathbf{1} < t_0 \vdash \mathbf{1} < t_0$
- (C115) $t_0 = \mathbf{p}_0 \vdash t_0 = \mathbf{p}_0$
- (C116) $nat_{25} = t_0 \vdash nat_{25} = t_0$
- (C117) $nat_{25} = \mathbf{1} \vdash nat_{25} = \mathbf{1}$
- (C118) $nat_{25} * nat_{26} = t_0 \vdash nat_{25} * nat_{26} = t_0$
- (C119) $\mathbf{1} < t_0 \vdash \mathbf{1} < t_0$
- (C120) $t_0 = \mathbf{p}_1 \vdash t_0 = \mathbf{p}_1$
- (C121) $t_0 = \mathbf{p}_0 \vdash t_0 = \mathbf{p}_0$
- (C128) $m_0 = \mathbf{0} + (nat_{15} * t_0) \vdash m_0 = \mathbf{0} + (nat_{15} * t_0)$
- (C129) $t_0 = \mathbf{p}_2 \vdash t_0 = \mathbf{p}_2$
- (C130) $m_0 = \mathbf{0} + (nat_{14} * t_0) \vdash m_0 = \mathbf{0} + (nat_{14} * t_0)$
- (C131) $t_0 = \mathbf{p}_1 \vdash t_0 = \mathbf{p}_1$
- (C132) $m_0 = \mathbf{0} + (nat_{13} * t_0) \vdash m_0 = \mathbf{0} + (nat_{13} * t_0)$
- (C133) $t_0 = \mathbf{p}_0 \vdash t_0 = \mathbf{p}_0$
- (C139) $m_0 = \mathbf{1} \vdash m_0 = \mathbf{1}$
- (C140) $m_0 = \mathbf{1} \vdash m_0 = \mathbf{1}$
- (C142) $t_0 = \mathbf{p}_2, m_0 = \mathbf{1} \vdash m_0 = \mathbf{1}$
- (C145) $t_0 = \mathbf{p}_1, m_0 = \mathbf{1} \vdash m_0 = \mathbf{1}$
- (C148) $t_0 = \mathbf{p}_0, m_0 = \mathbf{1} \vdash m_0 = \mathbf{1}$
- (C150) $m_0 = \mathbf{0} + (nat_{18} * \mathbf{p}_2) \vdash m_0 = \mathbf{0} + (nat_{18} * \mathbf{p}_2)$

$$(C152) \quad m_0 = \mathbf{0} + (\text{nat}_{22} * t_0) \vdash m_0 = \mathbf{0} + (\text{nat}_{22} * t_0)$$

$$(C153) \quad t_0 = \mathbf{p}_1 \vdash t_0 = \mathbf{p}_1$$

$$(C154) \quad t_0 = \mathbf{p}_0 \vdash t_0 = \mathbf{p}_0$$

$$(C155) \quad m_0 = \mathbf{0} + (\text{nat}_{19} * \mathbf{p}_1) \vdash m_0 = \mathbf{0} + (\text{nat}_{19} * \mathbf{p}_1)$$

$$(C157) \quad m_0 = \mathbf{0} + (\text{nat}_{21} * t_0) \vdash m_0 = \mathbf{0} + (\text{nat}_{21} * t_0)$$

$$(C158) \quad t_0 = \mathbf{p}_0 \vdash t_0 = \mathbf{p}_0$$

$$(C159) \quad m_0 = \mathbf{0} + (\text{nat}_{20} * \mathbf{p}_0) \vdash m_0 = \mathbf{0} + (\text{nat}_{20} * \mathbf{p}_0)$$

4 Clauses with Reflexivity

$$(C100) \quad \vdash \mathbf{p}_2 = \mathbf{p}_2$$

$$(C105) \quad \vdash \mathbf{p}_1 = \mathbf{p}_1$$

$$(C110) \quad \vdash \mathbf{p}_0 = \mathbf{p}_0$$

$$(C134) \quad \vdash m_0 = \mathbf{1}, m_0 = m_0$$

$$(C151) \quad \vdash \mathbf{p}_2 = \mathbf{p}_2$$

$$(C156) \quad \vdash \mathbf{p}_1 = \mathbf{p}_1$$

$$(C160) \quad \vdash \mathbf{p}_0 = \mathbf{p}_0$$

$$(C161) \quad \vdash \mathbf{1} = \mathbf{1}$$

5 Explicit Axioms

$$(A1) \quad \vdash k + l = l + k$$

$$(A2) \quad \vdash k + (l + m) = (k + l) + m$$

$$(A3) \quad \vdash (k + l) + m = k + (l + m) \text{ (subsumes 3 clauses)}$$

$$(A4) \quad \vdash k + \mathbf{0} = k$$

$$(A5) \quad k + l = k + m \vdash l = m$$

$$(A6) \quad \vdash \mathbf{0} + k = k \text{ (subsumes 7 clauses)}$$

$$(A7) \quad k + l = m + l \vdash k = m$$

$$(A8) \quad k = l + k \vdash l = \mathbf{0}$$

$$(A9) \quad k = k + l \vdash l = \mathbf{0}$$

$$(A10) \quad k + l = k \vdash l = \mathbf{0}$$

$$(A11) \quad k + l = l \vdash k = \mathbf{0}$$

$$(A12) \quad k = l \vdash m + k = m + l$$

- (A13) $\mathbf{1} + (k + \mathbf{1}) = \mathbf{1} \vdash$ (subsumes 1 clause)
- (A14) $\vdash k * l = l * k$ (subsumes 1 clause)
- (A15) $k + \mathbf{1} = \mathbf{0} \vdash$
- (A16) $\vdash k * (l * m) = (k * l) * m$
- (A17) $\vdash (k * l) * m = k * (l * m)$
- (A18) $\vdash k * \mathbf{1} = k$
- (A19) $\vdash \mathbf{1} * k = k$
- (A20) $\vdash k * (l + m) = (k * l) + (k * m)$
- (A21) $\vdash (k + l) * m = (k * m) + (l * m)$
- (A22) $\vdash (k * l) + (k * m) = k * (m + l)$
- (A23) $\vdash (k * l) + (m * l) = (k + m) * l$ (subsumes 3 clauses)
- (A24) $\vdash (k * l) + k = k * (l + \mathbf{1})$
- (A25) $\vdash (k + l) * m = (l * m) + (k * m)$
- (A26) $\mathbf{1} = k * l \vdash k = \mathbf{1}$
- (A27) $k < l, k < m, l < m, k + (i * m) = l + (j * m) \vdash$ (subsumes 3 clauses)
- (A28) $\mathbf{1} = l * k \vdash k = \mathbf{1}$
- (A29) $k < l, k < m, l < m, l + (i * m) = k + (j * m) \vdash$ (subsumes 3 clauses)
- (A30) $\vdash k = l, k < l, l < k$ (subsumes 3 clauses)
- (A31) $\vdash \mathbf{0} < k + \mathbf{1}$
- (A32) $n + \mathbf{1} < m \vdash n < m$ (subsumes 3 clauses)
- (A33) $\mathbf{1} < k, k = \mathbf{1} \vdash$
- (A34) $\mathbf{1} < k, \mathbf{1} = l * k \vdash$