Benchmarking Linear Logic Encoding Petri Nets

03 October 2018

Abstract

Proof trees for the benchmark MCC: encoding Petri-nets into linear logic. See more information at $\overline{\text{URL TO BE PROVIDED}}$

1 General Information

- Test run on QEMU Virtual CPU, 2GHz, 64 bits, 2GiB of RAM running Ubuntu.
- Maude version: 2.7.1 built: Oct 2 2017.
- The search procedure considers proofs using up to 101 times the copy rule (focusing on one of the formulas of the classical context).
- Timeout: 2min.
- For the sake of readability, the classical context containing the encoding of transition rules is depicted as Γ Moreover, Δ represents the hypothesis of the conjecture that, in all the cases, include the encoding of the rules and the initial marking.

Number of files: 2.073Proved sequents: 183

file: MCC/Angiogenesis_angiogenesis-01_100_1.p (2699 ms)

| MILESTON | Cold | MILESTON |

file: MCC/Angiogenesis_angiogenesis-01_10_1.p (2789 ms)

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file:
                 MCC/Angiogenesis_angiogenesis-01_1_1.p (2426 ms)
                                              \overline{\Gamma: \ KdStarPg \vdash KdStarPg} \ \otimes
                                                    : Akt, Enz, Gab1 \vdash Akt \otimes Enz \otimes Gab1
                                                          \Gamma:\ Akt, Enz, Gab1, KdStarPg \vdash Akt \otimes Enz \otimes Gab1 \otimes KdStarPg
                                                                                                                                                            \Gamma: Pip2 \vdash Pip2 \otimes
                                                                 \Gamma:\ Akt, Enz, Gab1, KdStarPg, P3'k \vdash Akt \otimes Enz \otimes Gab1 \otimes KdStarPg \otimes P3'k

\underline{\Gamma : KdStar \vdash KdStar} \quad \underline{\Gamma : Pg \vdash Pg} \otimes 

                                                                        \Gamma:\ Akt, Enz, Gab1, KdStarPg, P3'k, Pip2 \vdash Akt \otimes Enz \otimes Gab1 \otimes KdStarPg \otimes P3'k \otimes Pip2
                                                                                \Gamma: Akt, Enz, Gab1, KdStarPg, P3'k, Pip2, Pten \vdash Akt \otimes Enz \otimes Gab1 \otimes KdStarPg \otimes P3'k \otimes Pip2 \otimes Pten \\ - \circ
    \Gamma : KdStar, Pg \vdash KdStar \otimes Pg
                           \frac{dr \otimes Pg}{\Gamma: Akt, Enz, Gab1, KdStar, P3'k, Pg, Pip2, Pten, KdStar \otimes Pg - KdStar Pg \vdash Akt \otimes Enz \otimes Gab1 \otimes KdStar Pg \otimes P3'k \otimes Pip2 \otimes Pten}{D_{C}}
                                          \Gamma: Akt, Enz, Gab1, KdStar, P3'k, Pg, Pip2, Pten \vdash Akt \otimes Enz \otimes Gab1 \otimes KdStarPg \otimes P3'k \otimes Pip2 \otimes Pten \star \star
                                                               \Gamma: \Delta \vdash Akt \otimes Enz \otimes Gab1 \otimes KdStarPg \otimes P3'k \otimes Pip2 \otimes Pten
                 MCC/Angiogenesis_angiogenesis-01_20_1.p (2740 ms)
  file:
                 MCC/Angiogenesis_angiogenesis-01_50_1.p (2775 ms)
 file:
                 MCC/Angiogenesis_angiogenesis-01_5_1.p (1469 ms)
  file:
                 MCC/AutoFlight_afcs_01_a_100_1.p (31901 ms)
                                                                  \Gamma: p10 \vdash p10 \otimes
                                                      \Gamma: p1 \vdash p1
                                                          \frac{\Gamma: \ p1, p10 \vdash p1 \otimes p10}{\Gamma: \ p1, p10, p17 \vdash p1 \otimes p10} \otimes \frac{\Gamma: \ p17 \vdash p17}{\Gamma: \ p1, p10, p17 \vdash p1 \otimes p10 \otimes p17}
                                                                             : p1, p10, p17, p23, p29 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29
                                                                                  \Gamma: p9 \vdash p9
\Gamma: \ p1, p10, p17, p23, p29, p30, p4, p7, p9, p9 - p8 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8
  file:
                 MCC/AutoFlight_afcs_01_a_1_1.p (30352 ms)
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\frac{\Gamma\colon p10\vdash p10}{\Gamma\colon p10, p17\vdash p17} \otimes \frac{\Gamma\colon p23\vdash p23}{\Gamma\colon p23\vdash p23} \otimes \frac{\Gamma\colon p29\vdash p29}{\Gamma\colon p29\vdash p29} \otimes \frac{\Gamma\colon p3\vdash p3}{\Gamma\colon p30\vdash p30} \otimes \frac{\Gamma\colon p30\vdash p30}{\Gamma\colon p30\vdash p30} \otimes \frac
                                                                                                                                                                                                                                                                                                                                                      \Gamma: \ p10, p17, p23, p29, p3, p30, p6, p7, p9 \vdash p10 \otimes p17 \otimes p23 \otimes p29 \otimes p3 \otimes p30 \otimes p6 \otimes p7 \otimes p9 \\ \star \\ \star
                                                                                                                                                                                                                                                                                                                                                                                                                                     \frac{\Gamma: \ \Delta \vdash p10 \otimes p17}{\otimes p23 \otimes p29 \otimes p3 \otimes p30 \otimes p6 \otimes p7 \otimes p9} \ \_{\circ}
         \Gamma: p0 \vdash p0
                                                                                 \Gamma: \ p0, p0 \multimap p30 \otimes p29 \otimes p23 \otimes p17 \otimes p10 \otimes p9 \otimes p7 \otimes p6 \otimes p3 \vdash p10 \otimes p17 \otimes p23 \otimes p29 \otimes p3 \otimes p30 \otimes p6 \otimes p7 \otimes p9 \\ D_{C}
                                                                                                                                                                                                                        \Gamma: \ p0 \vdash p10 \otimes p17 \otimes p23 \otimes p29 \otimes p3 \otimes p30 \otimes p6 \otimes p7 \otimes p9
                                                                                                                                                                                                                         \Gamma: \ \Delta \vdash p10 \otimes p17 \otimes p23 \otimes p29 \otimes p3 \otimes p30 \otimes p6 \otimes p7 \otimes p9
              file:
                                                                            MCC/AutoFlight_afcs_01_a_20_1.p (32941 ms)
                                                                                                                                     \Gamma: p6 \vdash p6
                                                                             \Gamma: p3 \vdash p3
         \frac{\Gamma \colon p0, p0 \multimap p30 \otimes p29 \otimes p23 \otimes p17 \otimes p10 \otimes p9 \otimes p7 \otimes p6 \otimes p3 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8}{\Gamma \colon p0 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8} \frac{\Gamma}{\Gamma} \colon D \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8} \xrightarrow{\bullet} D_C 
MCC/AutoFlight_afcs_01_a_5_1.p (40702 ms)
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file: MCC/AutoFlight_afcs_01_b_1_1.p (101 ms)
\Gamma: p0 \vdash p0 \quad \overline{\Gamma: p2 \vdash p2}
    \frac{\Gamma:\ p0,p0\multimap p2\vdash p2}{\frac{\Gamma:\ p0\vdash p2}{\Gamma:\ \Delta\vdash p2}}\,\star
 file: MCC/AutoFlight_afcs_01_b_5_1.p (451 ms)
                                                                                                                         \frac{\overline{\Gamma: p110 \vdash p110} \quad \overline{\Gamma: p3 \vdash p3}}{\Gamma: p110, p3 \vdash p110 \otimes p3} \otimes \overline{\Gamma: p65 \vdash p65}
                                                                                                                                      \frac{\text{ol}\,10,p3\vdash p110\otimes p3}{\Gamma\colon p110,p3,p65\vdash p110\otimes p3\otimes p65}\otimes\frac{\Gamma\colon p93\vdash p93}{\Gamma\colon p93\vdash p93\otimes p65}\otimes\frac{\Gamma\colon p93\vdash p93}{\mathbb{E}^{2}}\otimes
                                                                                                                                                 \Gamma: p110, p3, p65, p93 \vdash p110 \otimes p3 \otimes p65 \otimes p93
                                                                                                                                                            \Gamma: \Delta \vdash p110 \otimes p3 \otimes p65 \otimes p93
                                                                                              \Gamma: p64 \vdash p64
                                                                                                       \frac{1}{\Gamma} : \underbrace{p110, p3, p64, p64 \multimap p93 \otimes p65 \vdash p110 \otimes p3 \otimes p65 \otimes p93}_{C} D_{C}
                                                                                                                     \Gamma: p110, p3, p64 \vdash p110 \otimes p3 \otimes p65 \otimes p93
                                                                                                                             \Gamma: \ \Delta \vdash p110 \otimes p3 \otimes p65 \otimes p93
                                                                             \frac{1}{\Gamma}: \ p3, p63, p63 \multimap p110 \otimes p64 \vdash p110 \otimes p3 \otimes p65 \otimes p93}{\Gamma} \ D_C
                                                                                             \Gamma: p3, p63 \vdash p110 \otimes p3 \otimes p65 \otimes p93
                                             \Gamma: p1 \vdash p1
                                                                                               \Gamma: \ \Delta \vdash p110 \otimes p3 \otimes p65 \otimes p93
                                                          \frac{\Gamma: p1, p1 \multimap p63 \otimes p3 \vdash p110 \otimes p3 \otimes p65 \otimes p93}{\Gamma: p1, p1 \multimap p63 \otimes p3 \vdash p110 \otimes p3 \otimes p65 \otimes p93} D_C
                      \Gamma: p2 \vdash p2
                                                                     \Gamma: p1 \vdash p110 \otimes p3 \otimes p65 \otimes p93
                                       \frac{\Gamma: p2, p2 \multimap p1 \vdash p110 \otimes p3 \otimes p65 \otimes p93}{\Gamma: p2, p2 \multimap p1 \vdash p110 \otimes p3 \otimes p65 \otimes p93} D_C
                                              \Gamma: p2 \vdash p110 \otimes p3 \otimes p65 \otimes p93
\Gamma: p0 \vdash p0
               \frac{\Gamma: p0, p0 \multimap p2 \vdash p110 \otimes p3 \otimes p65 \otimes p93}{27 \circ p2} D_C
                      \frac{p_0, p_0 - p_2}{\Gamma: p_0 \vdash p_{110} \otimes p_3 \otimes p_{65} \otimes p_{93}} \star
                       \overline{\Gamma: \ \Delta \vdash p110 \otimes p3 \otimes p65 \otimes p93}
                   MCC/AutoFlight_afcs_02_b_10_1.p (52225 ms)
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MCC/AutoFlight_afcs_02_b_1_1.p (258 ms)
\Gamma: p0 \vdash p0 \quad \Gamma: p2 \vdash p2
     \frac{\Gamma: p0, p0 \multimap p2 \vdash p2}{\Gamma: p0 \vdash p2} \stackrel{}{\sim} D_C
 file: MCC/AutoFlight_afcs_02_b_5_1.p (1037 ms)
                                                                                                                                               \frac{\overline{\Gamma:\ p120\vdash p120}\quad \overline{\Gamma:\ p125\vdash p125}}{\Gamma:\ p120,p125\vdash p120\otimes p125}\ \otimes\ \overline{\Gamma:\ p202\vdash p202}
                                                                                                                                                               \Gamma: p120, p125, p202 \vdash p120 \otimes p125 \otimes p202
                                                                                                                                                                            \frac{\Gamma: \ p120, p125, p202, p4 \vdash p120 \otimes p125 \otimes p202 \otimes p4}{\star} \ \star
                                                                                                                                                                                           \Gamma: \Delta \vdash p120 \otimes p125 \otimes p202 \otimes p4  \rightarrow
                                                                                                                             \frac{\Gamma: \ p125, p202, p3, p3 \multimap p120 \otimes p4 \vdash p120 \otimes p125 \otimes p202 \otimes p4}{\Gamma: \ p125, p202, p3 \vdash p120 \otimes p125 \otimes p202 \otimes p4} \ \Sigma
                                                                                                                                                        \Gamma: \Delta \vdash p120 \otimes \underline{p125} \otimes p202 \otimes p4
                                                                                 \Gamma: p124 \vdash p124
                                                                                         \frac{\Gamma: \ p124, p3, p124 \multimap p202 \otimes p125 \vdash p120 \otimes p125 \otimes p202 \otimes p4}{\Gamma: \ p124, p3, p124 \multimap p202 \otimes p125 \vdash p120 \otimes p125 \otimes p202 \otimes p4} \ D_C
                                                                                                               \Gamma: p124, p3 \vdash p120 \otimes p125 \otimes p202 \otimes p4
                                                                                                                    \Gamma: \Delta \vdash p120 \otimes p125 \otimes p202 \otimes p4 \longrightarrow
                                                      \overline{\Gamma: p1 \vdash p1}
                                                                    \frac{\Gamma \colon p1, p1 \multimap p124 \otimes p3 \vdash p120 \otimes p125 \otimes p202 \otimes p4}{\Gamma \colon p1 \vdash p120 \otimes p125 \otimes p202 \otimes p4} \ D_C
                           \Gamma: p2 \vdash p2
                                               \frac{\Gamma: p2, p2 \multimap p1 \vdash p120 \otimes p125 \otimes p202 \otimes p4}{\Gamma: p2, p2 \multimap p1 \vdash p120 \otimes p125 \otimes p202 \otimes p4} D_C
                                                       \frac{\Gamma: p2 \vdash p120 \otimes p125 \otimes p202 \otimes p4}{} - \diamond
\Gamma: p0 \vdash p0
                  \frac{po}{\Gamma}: \ \underline{p0, p0 \multimap p2 \vdash p120 \otimes p125 \otimes p202 \otimes p4} \ D_C
                           \frac{\Gamma: \ p0 \vdash p120 \otimes p125 \otimes p202 \otimes p4}{\Gamma: \ \Delta \vdash p120 \otimes p125 \otimes p202 \otimes p4} \ \star
 file: MCC/AutoFlight_afcs_03_b_1_1.p (621 ms)
\overline{\Gamma: p0} \vdash p0 \quad \Gamma: p2 \vdash p2
     \frac{\Gamma: p0, p0 \multimap p2 \vdash p2}{\Gamma: p0 \vdash p2} \star D_C
  file: MCC/AutoFlight_afcs_03_b_5_1.p (2215 ms)
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\frac{\overline{\Gamma : p181 \vdash p181} \quad \overline{\Gamma : p186 \vdash p186}}{\underline{\Gamma : p181, p186 \vdash p181} \otimes p186} \otimes \frac{\overline{\Gamma : p294 \vdash p294}}{\underline{\Gamma : p294 \vdash p294}} \otimes
                                                                                                                                                                                             \Gamma: p181, p186, p294 \vdash p181 \otimes p186 \otimes p294
                                                                                                                                                                                                            \Gamma: p181, p186, p294, p4 \vdash p181 \otimes p186 \otimes p294 \otimes p4
                                                                                                                                          \frac{\overline{\Gamma : p3 \vdash p3}}{\frac{\Gamma : p186, p294, p3, p3 \multimap p181 \otimes p181 \otimes p186 \otimes p294 \otimes p4}{\Gamma : p186, p294, p3, p3 \multimap p181 \otimes p4 \vdash p181 \otimes p186 \otimes p294 \otimes p4}} \stackrel{}{}_{C} \frac{\Gamma : p186, p294, p3, p3 \multimap p181 \otimes p186 \otimes p294 \otimes p4}{\Gamma : p186, p294, p3 \vdash p181 \otimes p186 \otimes p294 \otimes p4}} \xrightarrow{\star} D_{C}
                                                                                                                                                                                    \frac{180, p294, p3 + p281 \otimes p}{\Gamma : \Delta \vdash p181 \otimes p186 \otimes p294 \otimes p4} \rightarrow
                                                                                                           \Gamma: \underbrace{p185, p3, p185 \multimap p294 \otimes p186 \vdash p181 \otimes p186 \otimes p294 \otimes p4}_{D_C} \ D_C
                                                                                                                                    \Gamma: p185, p3 \vdash p181 \otimes p186 \otimes p294 \otimes p4
                                                                                                                                          \Gamma: \Delta \vdash p181 \otimes p186 \otimes p294 \otimes p4
                                                                \Gamma: p1 \vdash p1
                                                                                 \Gamma: p1, p1 \multimap p185 \otimes p3 \vdash p181 \otimes p186 \otimes p294 \otimes p4
\Gamma: p1, p1 \multimap p185 \otimes p3 \vdash p181 \otimes p186 \otimes p294 \otimes p4
D_C
                                                                                                    \Gamma: p1 \vdash \underline{p181 \otimes p186 \otimes p294 \otimes p4}
                                \overline{\Gamma:\ p2\vdash p2}
                                                       \frac{p_2}{\Gamma: p_2, p_2 \multimap p_1 \vdash p_181 \otimes p_186 \otimes p_294 \otimes p_4} D_C
                                                                  \frac{\Gamma: p2 \vdash p181 \otimes p186 \otimes p294 \otimes p4}{\Gamma: p2 \vdash p181 \otimes p186 \otimes p294 \otimes p4} \  \, - \circ
\boxed{ \underline{\Gamma : p0 \vdash p0} }
                      \frac{p_0}{\Gamma: p_0, p_0 \multimap p_2 \vdash p_181 \otimes p_186 \otimes p_294 \otimes p_4} D_C
                                 \frac{\Gamma:\ p0 \vdash p181 \otimes p186 \otimes p294 \otimes p4}{\Gamma:\ \Delta \vdash p181 \otimes p186 \otimes p294 \otimes p4} \ \star
  file:
                             MCC/AutoFlight_afcs_04_b_10_1.p (117074 ms)
  file: MCC/AutoFlight_afcs_04_b_1_1.p (1086 ms)
\overline{\Gamma: p0 \vdash p0} \quad \overline{\Gamma: p2 \vdash p2}
      \frac{\Gamma: p0, p0 \multimap p2 \vdash p2}{\frac{\Gamma: p0 \vdash p2}{\Gamma: \Delta \vdash p2}} \star
   file: MCC/AutoFlight_afcs_04_b_5_1.p (4650 ms)
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\frac{\overline{\Gamma: p248 \vdash p248} \quad \overline{\Gamma: p3 \vdash p3}}{\underline{\Gamma: p248, p3 \vdash p248 \otimes p3}} \otimes \frac{\overline{\Gamma: p369 \vdash p369}}{\overline{\Gamma: p248, p3, p369 \vdash p248 \otimes p3 \otimes p369}} \otimes \frac{\overline{\Gamma: p386 \vdash p386}}{\overline{\Gamma: p386 \vdash p386}} \otimes \frac{\overline{\Gamma: p386 \vdash p386}}{\overline{
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    \Gamma: p248, p3, p369, p386 \vdash p248 \otimes p3 \otimes p369 \otimes p386
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        \Gamma: \Delta \vdash p248 \otimes p3 \otimes p369 \otimes p386 _{-\circ}
                                                                                                                                                                                                                                                                                                                                                                      \Gamma: p247 \vdash p247
                                                                                                                                                                                                                                                                                                                                                                                                \begin{array}{c} p241 + p241 \\ \hline \Gamma : p247, p3, p386, p247 \multimap p369 \otimes p248 \vdash p248 \otimes p389 \otimes p386 \\ \hline \end{array} \\ \begin{array}{c} D_C \\ \hline \end{array} 
                                                                                                                                                                                                                                                                                                                                                                                                                                                               \Gamma: p247, p3, p386 \vdash p248 \otimes p3 \otimes p369 \otimes p386
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               \Gamma : \Delta \vdash p248 \otimes p3 \otimes p369 \otimes p386 \longrightarrow
                                                                                                                                                                                                                                                          \Gamma: p246 \vdash p246
                                                                                                                                                                                                                                                                                             \frac{1}{\Gamma} : p246, p3, p246 - p386 \otimes p247 \vdash p248 \otimes p3 \otimes p369 \otimes p386} D_C
                                                                                                                                                                                                                                                                                                                                                            \Gamma: p246, p3 \vdash p248 \otimes p3 \otimes p369 \otimes p386 
                                                                                                                                                                                                                                                                                                                                                                          \Gamma: \Delta \vdash \underline{p248 \otimes p3 \otimes p369 \otimes p386} \rightarrow
                                                                                                                                                                       \Gamma: p1 \vdash p1
                                                                                                                                                                                                                      \frac{\Gamma: \ p1, p1 \multimap p246 \otimes p3 \vdash p248 \otimes p3 \otimes p369 \otimes p386}{2 \otimes p3 \otimes p369 \otimes p386} \ D_C
                                                                                                                                                                                                                                                                    \frac{\Gamma: p1 \vdash p248 \otimes p3 \otimes p369 \otimes p386}{\Gamma: p1 \vdash p248 \otimes p3 \otimes p369 \otimes p386} \rightarrow
                                                                                     \Gamma: p2 \vdash p2
                                                                                                                                                 \frac{\Gamma: p2, p2 \multimap p1 \vdash p248 \otimes p3 \otimes p369 \otimes p386}{\Gamma: p2 \vdash p248 \otimes p3 \otimes p369 \otimes p386} D_C
                                                             \frac{\Gamma: p0, p0 \multimap p2 \vdash p248 \otimes p3 \otimes p369 \otimes p386}{\square} D_C
                                                                                          \Gamma: p0 \vdash p248 \otimes p3 \otimes p369 \otimes p386
                                                                                          \overline{\Gamma:\ \Delta \vdash p248 \otimes p3 \otimes p369 \otimes p386}
          file: MCC/AutoFlight_afcs_05_b_1_1.p (1814 ms)
 \frac{\overline{\Gamma:\ p0\vdash p0}\quad \overline{\Gamma:\ p2\vdash p2}}{\frac{\Gamma:\ p0\vdash p0 \rightarrow p2\vdash p2}{\Gamma:\ p0\vdash p2}} \stackrel{\frown}{\longrightarrow} D_C
           file: MCC/AutoFlight_afcs_05_b_5_1.p (7526 ms)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   \frac{ \frac{\Gamma : \ p3 \vdash p3}{\Gamma : \ p3.09 \vdash p3.09} \frac{\Gamma : \ p3.09 \vdash p3.09}{\Gamma : \ p3.0309 \vdash p3.0909} \otimes \frac{\Gamma : \ p461 \vdash p461}{\Gamma : \ p3.0309, p461 \vdash p3.0909 \otimes p461} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac{\Gamma : \ p478 \vdash p478}{\Gamma : \ p478 \vdash p478} \otimes \frac
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    \Gamma: \ p3, p309, p461, p478 \vdash p3 \otimes p309 \otimes p461 \otimes p478 \\ \star
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        \frac{\Gamma: \ \Delta \vdash p3 \otimes p309 \otimes p461 \otimes p478}{\square} \rightarrow
                                                                                                                                                                                                                                                                                                                                                                      \Gamma: p308 \vdash p308
                                                                                                                                                                                                                                                                                                                                                                                                \Gamma: \ \underline{p3, p308, p478, p308} \multimap \underline{p461} \otimes \underline{p309} \vdash \underline{p3} \otimes \underline{p309} \otimes \underline{p461} \otimes \underline{p478} \ \underline{D_C}
                                                                                                                                                                                                                                                                                                                                                                                                                                                            \Gamma: p3, p308, p478 \vdash p3 \otimes p309 \otimes p461 \otimes p478
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            \Gamma: \Delta \vdash p3 \otimes p309 \otimes p461 \otimes p478
                                                                                                                                                                                                                                                          \Gamma: p307 \vdash p307
                                                                                                                                                                                                                                                                                            \frac{301}{\Gamma} : p307, p307, p307 \multimap p478 \otimes p308 \vdash p3 \otimes p309 \otimes p461 \otimes p478}{D_C}
                                                                                                                                                                                                                                                                                                                                                      \frac{\Gamma \colon p3, p307 \vdash p3 \otimes p309 \otimes p461 \otimes p478}{\Gamma \colon \Delta \vdash p3 \otimes p309 \otimes p461 \otimes p478} \star
                                                                                                                                                                                                                    \Gamma: \ p1, p1 \multimap p307 \otimes p3 \vdash p3 \otimes p309 \otimes p461 \otimes p478 \\ D_C
                                                                                                                                                                                                                                             \frac{\Gamma: p1 \vdash p3 \otimes p309 \otimes p461 \otimes p478}{\Gamma: p1 \vdash p3 \otimes p309 \otimes p461 \otimes p478} \rightarrow
                                                                                     \Gamma: p2 \vdash p2
                                                                                                                                                   \frac{\Gamma : \ p2, p2 \multimap p1 \vdash p3 \otimes p309 \otimes p461 \otimes p478}{\Gamma : \ p2 \vdash p3 \otimes p309 \otimes p461 \otimes p478} \ D_C
    \Gamma: p0 \vdash p0
                                                              \frac{1}{\Gamma}: \ \underline{p0, p0} - \underline{p2} \vdash \underline{p3} \otimes \underline{p309} \otimes \underline{p461} \otimes \underline{p478} \\ \underline{D_C}
                                                                                        \frac{\Gamma: p0 \vdash p3 \otimes p309 \otimes p461 \otimes p478}{1 \otimes p478} \star
                                                                                          \overline{\Gamma: \ \Delta \vdash p3 \otimes p309 \otimes p461 \otimes p478}
                                                                              MCC/AutoFlight_afcs_06_b_1_1.p (2507 ms)
 \begin{array}{c|cccc} \overline{\Gamma: p0 \vdash p0} & \overline{\Gamma: p2 \vdash p2} \\ \hline \frac{\Gamma: p0, p0 \multimap p2 \vdash p2}{\Gamma: p0 \vdash p2} & D_C \\ \hline \frac{\Gamma: p0 \vdash p2}{\Gamma: \Delta \vdash p2} & \star \end{array}
           file: MCC/AutoFlight_afcs_06_b_5_1.p (10496 ms)
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\frac{\overline{\Gamma:\ p3\vdash p3}\quad \overline{\Gamma:\ p370\vdash p370}}{\underline{\Gamma:\ p3,p370\vdash p3\otimes p370}}\otimes \frac{\overline{\Gamma:\ p553\vdash p553}}{\overline{\Gamma:\ p553\vdash p553}}\otimes \frac{\overline{\Gamma:\ p570\vdash p570}}{\overline{\Gamma:\ p570\vdash p570}}\otimes
                                                                                                                                                                                                                                                                                                                                                                             \Gamma: p3, p370, p553, p570 \vdash p3 \otimes p370 \otimes p553 \otimes p570
                                                                                                                                                                                                                                                                                                                                                                                                             \Gamma: \ \Delta \vdash p3 \otimes p370 \otimes p553 \otimes p570 
                                                                                                                                                                                                                                           \overline{\Gamma: p369 \vdash p369}
                                                                                                                                                                                                                                                           \frac{p_{009} + p_{009}}{\Gamma : p_{3}, p_{369}, p_{570}, p_{369} \multimap p_{553} \otimes p_{370} \vdash p_{3} \otimes p_{370} \otimes p_{553} \otimes p_{570}}{p_{C}} D_{C}
                                                                                                                                                                                                                                                                                                      \Gamma: p3, p369, p570 \vdash p3 \otimes p370 \otimes p553 \otimes p570
                                                                                                                                                                                                                                                                                                                           \frac{\Gamma: \ \Delta \vdash p3 \otimes p370 \otimes p553 \otimes p570}{\square} \rightarrow
                                                                                                                                                                   \Gamma: p368 \vdash p368
                                                                                                                                                                                          \frac{\Gamma: \ p3, p368, p368 - p570 \otimes p369 \vdash p3 \otimes p370 \otimes p553 \otimes p570}{D_C} \ D_C
                                                                                                                                                                                                                                    \Gamma: p3, p368 \vdash p3 \otimes p370 \otimes p553 \otimes p570
                                                                                                                                                                                                                                               \Gamma: \ \Delta \vdash p3 \underline{\otimes p370 \otimes p553 \otimes p570} \ \_ 
                                                                                                             \Gamma: p1 \vdash p1
                                                                                                                                            \frac{\Gamma\colon p1, p1\multimap p368\otimes p3\vdash p3\otimes p359\otimes p553\otimes p570}{\Gamma\colon p1, p1\multimap p368\otimes p3\vdash p3\otimes p370\otimes p53\otimes p570}\ D_C
                                                                                                                                                                            \Gamma: p1 \vdash p3 \otimes p370 \otimes p553 \otimes p570
                                                      \Gamma: p2 \vdash p2
                                                                                               \frac{\Gamma: p2, p2 \multimap p1 \vdash p3 \otimes p370 \otimes p553 \otimes p570}{\Gamma: p2, p2 \multimap p1 \vdash p3 \otimes p370 \otimes p553 \otimes p570} D_C
                                                                                                                 \Gamma: p2 \vdash p3 \underline{\otimes p370 \otimes p553 \otimes p570} \quad \_ 
                                      \frac{\Gamma: p0, p0 \multimap p2 \vdash p3 \otimes p370 \otimes p553 \otimes p570}{\sum_{C} p3 \otimes p370 \otimes p553 \otimes p570} D_C
                                                         \frac{\Gamma:\ p0\vdash p3\otimes p370\otimes p553\otimes p570}{\Gamma:\ \Delta\vdash p3\otimes p370\otimes p553\otimes p570}\ \star
   file: MCC/AutoFlight_afcs_12_b_1_1.p (10975 ms)
\Gamma: p0 \vdash p0 \quad \Gamma: p2 \vdash p2
           \frac{\Gamma: p0, p0 \multimap p2 \vdash p2}{\frac{\Gamma: p0 \vdash p2}{\Gamma: \Delta \vdash p2}} \star
    file: MCC/AutoFlight_afcs_12_b_5_1.p (43171 ms)
                                                                                                                                                                                                                                                                                                    \frac{\overline{\Gamma : p1122 \vdash p1122} \quad \overline{\Gamma : p4 \vdash p4}}{\underline{\Gamma : p1122, p4 \vdash p1122 \otimes p4}} \otimes \frac{\overline{\Gamma : p730 \vdash p730}}{\overline{\Gamma : p1122, p4, p730 \vdash p1122 \otimes p4 \otimes p730}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p735 \vdash p735}}{\overline{\Gamma : p735 \vdash p735}} \otimes \frac{\overline{\Gamma : p7
                                                                                                                                                                                                                                                                                                                                                                \Gamma: p1122, p4, p730, p735 \vdash p1122 \otimes p4 \otimes p730 \otimes p735
                                                                                                                                                                                                                                                                                                                                                                                                   \Gamma: \ \Delta \vdash p1122 \otimes p4 \otimes p730 \otimes p735 \ \ -
                                                                                                                                                                                                                             \Gamma: p734 \vdash p734
                                                                                                                                                                                                                                              \begin{array}{l} p_{134} + p_{134} \\ \hline \Gamma : p_{4}, p_{730}, p_{734}, p_{734} \multimap p_{1122} \otimes p_{735} \vdash p_{1122} \otimes p_{4} \otimes p_{730} \otimes p_{735} \\ \hline D_C \end{array} 
                                                                                                                                                                                                                                                                                         \Gamma: p4, p730, p734 \vdash p1122 \otimes p4 \otimes p730 \otimes p735
                                                                                                                                                                                                                                                                                                           \Gamma: \Delta \vdash \underline{p1122 \otimes p4 \otimes p730 \otimes p735}_{-0}
                                                                                                                                                                                            \frac{1}{\Gamma}: p3, p734, p3 \multimap p730 \otimes p4 \vdash p1122 \otimes p4 \otimes p730 \otimes p735} D_C
                                                                                                                                                                                                                             \Gamma: p3, p734 \vdash p1122 \otimes p4 \otimes p730 \otimes p735 \\ \star
                                                                                                                                                                                                                                         \Gamma: \Delta \vdash p1122 \otimes p4 \otimes p730 \otimes p735
                                                                                                                                         \frac{\Gamma: \ p1, p1 \multimap p734 \otimes p3 \vdash p1122 \otimes p4 \otimes p730 \otimes p735}{\Gamma: \ p1 \vdash p1122 \otimes p4 \otimes p730 \otimes p735} \ D_C
                                                                                              \frac{\Gamma: \ p2, p2 \multimap p1 \vdash p1122 \otimes p4 \otimes p730 \otimes p735}{720 \circ 9735} \ D_C
                                                                                                               \frac{p_2, p_2 \multimap p_1 + p_{1122} \odot p_2 \odot p_{122}}{\Gamma : p_2 \vdash p_{1122} \otimes p_4 \otimes p_{730} \otimes p_{735}} \multimap
\Gamma: p0 \vdash p0
                                      \frac{\Gamma: p0, p0 \multimap p2 \vdash p1122 \otimes p4 \otimes p730 \otimes p735}{122 \otimes p4 \otimes p730 \otimes p735} D_C
                                                         \Gamma: p0 \vdash p1122 \otimes p4 \otimes p730 \otimes p735
                                                         \Gamma: \Delta \vdash p1122 \otimes p4 \otimes p730 \otimes p735
                                                  MCC/CSRepetitions_cs_repetitions-2-unfolded_1_1.p (5378 ms)
                                                MCC/CSRepetitions_cs_repetitions-2-unfolded_5_1.p (17933 ms)
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file: MCC/CircadianClock_circadian_clock-000001_100_1.p (1553 ms) $\frac{\Gamma \colon a \vdash a}{\Gamma \colon a, c \not = cap \vdash c \not = cap} \otimes \frac{\Gamma \colon da \vdash da}{\Gamma \colon a, c \not = cap \vdash a \otimes c \not = cap} \otimes \frac{\Gamma \colon da \vdash da}{\Gamma \colon dr \vdash dr} \otimes \frac{\Gamma \colon ma \vdash ma}{\Gamma \colon ma \land ma} \otimes \frac{\Gamma \colon mr \not = cap \vdash mr \not = cap}{\Gamma \colon r \not = cap \vdash r \not = cap} \otimes \frac{\Gamma \colon r \not = cap \vdash r \not = cap}{\Gamma \colon r \not = cap \vdash r \not = cap} \otimes \frac{\Gamma \colon r \not = cap \vdash r \not = cap}{\Gamma \colon r \not = cap \vdash r \not = cap} \otimes \frac{\Gamma \colon r \not = cap \vdash r \not = cap}{\Gamma \colon r \not = cap} \otimes \frac{\Gamma \colon r \not = cap \vdash r \not = cap}{\Gamma \colon r \not = cap} \otimes \frac{\Gamma \colon r \not = cap}{\Gamma \colon r \not = cap} \otimes \frac{\Gamma 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cap}{\Gamma \colon r \not= cap} \otimes \frac{\Gamma \colon r \not= cap}{\Gamma \colon r \colon r \lor = cap} \otimes \frac{\Gamma \colon r \vdash cap}{\Gamma \colon r \vdash cap} \otimes \frac{\Gamma \colon r \vdash cap}{\Gamma \colon r \colon = cap} \otimes \frac{\Gamma \colon r \vdash cap}{\Gamma \colon r \colon = cap} \otimes \frac{\Gamma \colon r \vdash cap}{\Gamma \colon r \colon = cap} \otimes \frac{\Gamma \colon r \vdash cap}{\Gamma \colon = cap} \times \frac{\Gamma \colon r \vdash cap}{\Gamma \colon = cap} \times \frac{\Gamma \colon r \vdash cap}{\Gamma \colon = cap} \times \frac{\Gamma \colon r \vdash cap}{\Gamma \colon = cap} \times \frac{\Gamma \colon r \vdash cap}{\Gamma \colon = cap} \times \frac{\Gamma \colon r \vdash cap}{\Gamma \colon = cap} \times \frac{\Gamma \colon r \vdash cap}{\Gamma$ $\Gamma: ma \vdash ma \quad \overline{\Gamma: a_'cap \vdash a_'cap} \otimes$ Γ : $a_'cap, ma \vdash ma \otimes a_'cap$ $\Gamma: \underline{da \vdash da} \quad \overline{\Gamma: ma_'cap \vdash ma_'cap} \otimes$ $\underline{\Gamma: a_'cap, c_'cap, da, dr, ma, mr_'cap, r_'cap} \vdash a \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap \xrightarrow{\star} \underline{}$ Γ : $da, ma_'cap \vdash da \otimes ma_'cap$ $\Gamma: a_'cap, c_'cap, da, dr, ma_'cap, mr_'cap, r_'cap \vdash a \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap \xrightarrow{\star} \star$: $\Delta \vdash a \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap$ file: MCC/CircadianClock_circadian_clock-000001_10_1.p (1522 ms) $\frac{\overline{\Gamma \colon a \vdash a} \quad \overline{\Gamma \colon c,'cap \vdash c,'cap}}{\Gamma \colon a,c,'cap \vdash a \otimes c,'cap} \otimes \frac{\Gamma \colon da \vdash da}{\Gamma \colon a,c,'cap, da \vdash a \otimes c,'cap \otimes da} \otimes \frac{\overline{\Gamma \colon dr \vdash dr}}{\Gamma \colon a,c,'cap, da, dr \vdash a \otimes c,'cap \otimes da \otimes dr} \otimes \frac{\overline{\Gamma \colon ma \vdash ma}}{\Gamma \colon a,c,'cap, da, dr \vdash a \otimes c,'cap \otimes da \otimes dr} \otimes \frac{\overline{\Gamma \colon ma \vdash ma}}{\Gamma \colon mr,'cap \vdash mr,'cap} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap \vdash r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap \vdash r,'cap}}{\Gamma \colon r,'cap}} \otimes \frac{\overline{\Gamma \colon r,'cap}$ $\Gamma: ma \vdash ma \qquad \overline{\Gamma: a_'cap \vdash a_'cap} \otimes$ $\Gamma: \ a, c_'cap, da, dr, ma, mr_'cap, r_'cap \vdash a \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap \xrightarrow{\star} \xrightarrow{\star}$ $\begin{array}{c} \Gamma: \ \Delta \vdash a \otimes c_' cap \otimes da \otimes dr \otimes ma \otimes mr_' cap \\ \hline \Gamma: \ a_' cap, c_' cap, da, dr, ma, mr_' cap, r_' cap, ma \otimes a_' cap \multimap a \otimes ma \vdash a \otimes c_' cap \otimes da \otimes dr \otimes ma \otimes mr_' cap \otimes r_' cap \\ \hline \Gamma: \ a_' cap, c_' cap, da, dr, ma, mr_' cap, r_' cap \vdash a \otimes c_' cap \otimes da \otimes dr \otimes ma \otimes mr_' cap \otimes r_' cap \\ \hline \Gamma: \ a_' cap, c_' cap, da, dr, ma, mr_' cap \otimes r_' cap \vdash a \otimes c_' cap \otimes da \otimes dr \otimes ma \otimes mr_' cap \otimes r_' cap \\ \hline \Gamma: \ \Delta \vdash a \otimes c_' cap \otimes da \otimes dr \otimes ma \otimes mr_' cap \otimes r_' cap \\ \hline \ C: \ a_' cap, c_' cap, da, dr, ma, mr_' cap \otimes da \otimes dr \otimes ma \otimes mr_' cap \otimes r_' cap \\ \hline \ C: \ a_' cap, c_' cap, da, dr, ma, mr_' cap \otimes da \otimes dr \otimes ma \otimes mr_' cap \otimes r_' cap \\ \hline \ C: \ a_' cap, c_' cap, da, dr, ma, mr_' cap, r_' cap \otimes r_' cap \\ \hline \ C: \ a_' cap, c_' cap, da, dr, ma, mr_' cap, r_' cap \otimes r_' cap \otimes r_' cap \otimes r_' cap \\ \hline \ C: \ a_' cap, c_' cap, da, dr, ma, mr_' cap, r_' cap \otimes r_'$ $\Gamma: \underline{\Delta \vdash a \otimes c_' cap \otimes da \otimes dr \otimes ma \otimes mr_' cap \otimes r_' cap}_{-\circ}$ Γ : $a_'cap, ma \vdash ma \otimes a_'cap$ $\Gamma: da \vdash da \quad \overline{\Gamma: ma_'cap \vdash ma_'cap} \otimes$ Γ : $da, ma_'cap \vdash da \otimes ma_'cap$ $\frac{\Gamma: a_' cap, c_' cap, da, dr, ma_' cap, mr_' cap, r_' cap, da \otimes ma_' cap \multimap ma \otimes da \vdash a \otimes c_' cap \otimes da \otimes dr \otimes ma \otimes mr_' cap \otimes r_' cap}{D_C}$ $\Gamma: \ a_'cap, c_'cap, da, dr, ma_'cap, mr_'cap, r_'cap \vdash a \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap \\ + \frac{1}{2} \left(\frac{1$ Γ : $\Delta \vdash a \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap$ MCC/CircadianClock_circadian_clock-000001_1_1.p (1499 ms) $\frac{\Gamma \colon a \text{'} cap \vdash a \text{'} cap}{\Gamma \colon a \text{'} cap \vdash a \text{'} cap} \stackrel{}{\Gamma \colon c \text{'} cap} \vdash c \text{'} cap}{} \otimes \frac{\Gamma \colon da \vdash da}{} \otimes \frac{}{\Gamma \colon dr \vdash dr} \otimes \frac{}{\Gamma \colon ma \vdash ma} \otimes \frac{}{\Gamma \colon mr \text{'} cap \vdash mr \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{}{\Gamma \colon r cap}$ $\Gamma: da \vdash da \quad \Gamma: ma_'cap \vdash ma_'cap \otimes$ $\Gamma: \ \underline{\Delta \vdash a_' cap \otimes c_' cap \otimes da \otimes dr \otimes ma \otimes mr_' cap \otimes r_' cap} \ \ \underline{\hspace{1cm}} \ \ \neg \circ$ Γ : $da, ma_'cap \vdash da \otimes ma_'cap$ $\underline{\Gamma}: \underline{a'}\underline{cap},\underline{c'}\underline{cap},\underline{da},\underline{dr},\underline{ma'}\underline{cap},\underline{mr'}\underline{cap},\underline{r'}\underline{cap},\underline{da}\otimes\underline{ma'}\underline{cap} - \underline{ma}\otimes\underline{da} \vdash \underline{a'}\underline{cap}\otimes\underline{c'}\underline{cap}\otimes\underline{da}\otimes\underline{dr}\otimes\underline{ma}\otimes\underline{mr'}\underline{cap}\otimes\underline{r'}\underline{cap} \\ \underline{D_C}$ Γ : $\Delta \vdash a_'cap \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap$ MCC/CircadianClock_circadian_clock-000001_20_1.p (1555 ms) $\frac{\Gamma\colon a\vdash a}{\Gamma\colon a,c.'cap\vdash a\otimes c.'cap}\otimes \frac{\Gamma\colon da\vdash da}{\Gamma\colon a,c.'cap\vdash a\otimes c.'cap}\otimes \frac{\Gamma\colon da\vdash da}{\Gamma\colon a,c.'cap,da\vdash a\otimes c.'cap\otimes da}\otimes \frac{\Gamma\colon dr\vdash dr}{\Gamma\colon a,c.'cap,da,dr\vdash a\otimes c.'cap\otimes da\otimes dr}\otimes \frac{\Gamma\colon ma\vdash ma}{\Gamma\colon a,c.'cap,da,dr\vdash a\otimes c.'cap\otimes da\otimes dr\otimes ma}\otimes \frac{\Gamma\colon mr.'cap\vdash mr.'cap}{\Gamma\colon a,c.'cap,da,dr,ma\vdash a\otimes c.'cap\otimes da\otimes dr\otimes ma\otimes mr.'cap}\otimes \frac{\Gamma\colon r.'cap\vdash r.'cap}{\Gamma\colon a.c.'cap,da,dr,ma,mr.'cap\vdash a\otimes c.'cap\otimes da\otimes dr\otimes ma\otimes mr.'cap\otimes r.'cap}\otimes \frac{\Gamma\colon r.'cap\vdash r.'cap}{\Gamma\colon a.c.'cap,da,dr,ma,mr.'cap\vdash a\otimes c.'cap\otimes da\otimes dr\otimes ma\otimes mr.'cap\otimes r.'cap}\otimes \frac{\Gamma\colon r.'cap\vdash r.'cap}{\Gamma\colon a.c.'cap,da,dr,ma,mr.'cap\vdash r.'cap}\otimes \frac{\Gamma\colon r.'cap\vdash r.'cap}{\Gamma\colon a.c.'cap\otimes r.'cap\otimes r.'cap\otimes r.'c$ $\Gamma: ma \vdash ma \quad \Gamma: a_'cap \vdash a_'cap$ \otimes Γ : $\Delta \vdash a \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap$ \longrightarrow Γ : $a_'cap, ma \vdash ma \otimes a_'cap$ $\frac{\Gamma: a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \multimap a \otimes ma \vdash a \otimes c.'cap \otimes da \otimes dr \otimes ma \otimes mr.'cap \otimes r.'cap}{DC}$ $\Gamma: da \vdash da \quad \Gamma: ma_'cap \vdash ma_'cap \otimes$ $\begin{array}{c|c} \Gamma : ma'cap \vdash ma_'cap \otimes & \Gamma : a'cap, c'cap, da, dr, ma, mr_'cap, r_'cap \vdash a \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap \\ \times u_'cap \vdash da \otimes ma_'cap \otimes mr_'cap \otimes r_'cap \\ \hline \Gamma : a'cap, c_'cap, da, dr, ma_'cap, mr_'cap, r_'cap, da \otimes ma_'cap \mapsto ma \otimes da \vdash a \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap \\ \hline \Gamma : a'cap, c_'cap, da, dr, ma_'cap, mr_'cap, r_'cap, r_'cap \vdash a \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap \\ \hline \Gamma : a'cap, c_'cap, da, dr, ma_'cap, mr_'cap, r_'cap \vdash a \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap \\ \hline \end{array}$

MCC/CircadianClock_circadian_clock-000001_50_1.p (1591 ms)

: $\Delta \vdash a \otimes c_'cap \otimes da \otimes dr \otimes ma \otimes mr_'cap \otimes r_'cap$

 Γ : $da, ma_'cap \vdash da \otimes ma_'cap$

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 \frac{\overline{\Gamma \colon a \vdash a} \quad \overline{\Gamma \colon c' cap \vdash c' cap}}{\Gamma \colon a, \underline{c' cap \vdash a \otimes c' cap}} \otimes \frac{\Gamma \colon da \vdash da}{\Gamma \colon dr \vdash dr} \otimes \frac{\Gamma \colon dr \vdash dr}{\Gamma \colon ma \vdash ma} \otimes \frac{\overline{\Gamma \colon ma \vdash ma}}{\Gamma \colon ma \otimes mr' cap} \otimes \frac{\Gamma \colon r' cap \vdash r' cap}{\Gamma \colon r' cap \otimes r' cap} \otimes \frac{\Gamma \colon r' cap \vdash r' cap}{\Gamma \colon r' cap \otimes r' cap} \otimes \frac{\Gamma \colon r' cap \vdash r' cap}{\Gamma \colon r' cap} \otimes \frac{\Gamma \colon r' cap}{\Gamma \colon r' cap} \times \frac{\Gamma \colon 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         \frac{\overline{\Gamma:\ ma \vdash ma} \quad \overline{\Gamma:\ a\_'cap \vdash a\_'cap}}{\Gamma:\ a\_'cap, ma \vdash ma \otimes a\_'cap} \ \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          \begin{array}{c} : a.'cap \vdash a.'cap \\ \vdash ma \otimes a.'cap \\ \hline \Gamma : a.c.'cap, da, dr, ma, mr.'cap, r.'cap \vdash a \otimes c.'cap \otimes da \otimes dr \otimes ma \otimes mr.'cap \otimes r.'cap \\ \hline \Gamma : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da, dr, ma, mr.'cap, r.'cap, ma \otimes a.'cap \\ \hline C : a.'cap, c.'cap, da
\Gamma: da \vdash da  \Gamma: ma\_'cap \vdash ma\_'cap \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     \underline{\Gamma}: \ a\_'cap, c\_'cap, da, dr, ma, mr\_'cap, r\_'cap \vdash a \otimes c\_'cap \otimes da \otimes dr \otimes ma \otimes mr\_'cap \otimes r\_'cap \xrightarrow{} \underbrace{} \ \star
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               \Gamma : \Delta \vdash a \otimes c \cdot ' cap \otimes da \otimes dr \otimes ma \otimes mr \cdot ' cap \otimes r \cdot ' cap
                                       \Gamma: da, ma\_'cap \vdash da \otimes ma\_'cap
                                                                                                                                                        \frac{\Gamma : \ a.'cap, c.'cap, da, dr, ma.'cap, mr.'cap, r.'cap, da \otimes ma.'cap - o \ ma \otimes da \vdash a \otimes c.'cap \otimes da \otimes dr \otimes ma \otimes mr.'cap \otimes r.'cap}{\Gamma : \ a.'cap, c.'cap, da, dr, ma.'cap, mr.'cap, r.'cap \vdash a \otimes c.'cap \otimes da \otimes dr \otimes ma \otimes mr.'cap \otimes r.'cap} \ D_C
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        \Gamma : \Delta \vdash a \otimes c\_'cap \otimes da \otimes dr \otimes ma \otimes mr\_'cap \otimes r\_'cap
                 file: MCC/CircadianClock_circadian_clock-000001_5_1.p (1510 ms)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     \frac{\Gamma \colon a \text{'} cap \vdash a \text{'} cap}{\Gamma \colon a \text{'} cap \vdash a \text{'} cap} \otimes \frac{\Gamma \colon da \vdash da}{\Gamma \colon da \vdash da} \otimes \frac{\Gamma \colon dr \vdash dr}{\Gamma \colon dr \vdash dr} \otimes \frac{\Gamma \colon ma \vdash ma}{\Gamma \colon mr \text{'} cap \vdash mr \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap \vdash r \text{'} cap}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap \vdash r \text{'} cap}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap \vdash r \text{'} cap}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap \vdash r \text{'} cap}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap \vdash r \text{'} cap}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap \vdash r \text{'} cap}{\Gamma \colon r \text{'} cap \vdash r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap \vdash r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap \vdash r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap \vdash r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r \text{'} cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r cap} \otimes \frac{\Gamma \colon r \text{'} cap}{\Gamma \colon r cap} \otimes \frac{\Gamma \colon r \text{'}
\overline{\Gamma: da \vdash da} \quad \overline{\Gamma: ma\_'cap \vdash ma\_'cap} \otimes
                                       \Gamma: da, ma\_'cap \vdash da \otimes ma\_'cap
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             \Gamma: \Delta \vdash a\_'cap \otimes c\_'cap \otimes da \otimes dr \otimes ma \otimes mr\_'cap \otimes r\_'cap
                                                                                                                                                                                                                                           \frac{1}{\Gamma}: \ a' cap, \underline{c}' cap, da, dr, ma' cap, mr' cap, r' cap, da \otimes ma' cap \multimap ma \otimes da \vdash \underline{a}' cap \otimes \underline{c}' cap \otimes da \otimes dr \otimes ma \otimes mr' cap \otimes \underline{r}' cap}{D_C}
                                                                                                                                                                                                                                                                                                                                                                                                                                               \Gamma: \ a\_'cap, e\_'cap, da, dr, ma\_'cap, mr\_'cap, r\_'cap \vdash a\_'cap \otimes e\_'cap \otimes da \otimes dr \otimes ma \otimes mr\_'cap \otimes r\_'cap = a\_'cap \otimes e\_'cap \otimes da \otimes dr \otimes ma \otimes mr\_'cap \otimes e\_'cap \otimes e\_'
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 \Gamma: \Delta \vdash a\_'cap \otimes c\_'cap \otimes da \otimes dr \otimes ma \otimes mr\_'cap \otimes r\_'cap
                 file:
                                                                                                                                                                                                                                  MCC/CloudDeployment_deploy_2_a_100_1.p (73332 ms)
                                                                                                                                                                                               \frac{\overline{\Gamma \colon p2 \vdash p2} \quad \overline{\Gamma \colon p28 \vdash p28}}{\underline{\Gamma \colon p2, p28 \vdash p2 \otimes p28}} \otimes \frac{\overline{\Gamma \colon p30 \vdash p30}}{\overline{\Gamma \colon p32 \vdash p32}} \otimes \frac{\overline{\Gamma \colon p32 \vdash p32}}{\overline{\Gamma \colon p2, p28, p30 \vdash p2 \otimes p28 \otimes p30}} \otimes \frac{\overline{\Gamma \colon p32 \vdash p32}}{\overline{\Gamma \colon p32 \vdash p32}} \otimes \frac{\overline{\Gamma \colon p4 \vdash p4}}{\overline{\Gamma \colon p41 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p4}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash 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\colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{\overline{\Gamma \colon p41 \vdash p41}}{\overline{\Gamma \colon p41 \vdash p41}} \otimes \frac{
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        \Gamma: \ p2, p28, p30, p32, p4, p56, p63, p65, p67 \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p3 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p67 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p67 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p67 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p67 \otimes
\Gamma : p0 \vdash p0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             \Gamma: \ \Delta \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67
                                                                                                                                                                                                                          \Gamma: \ p0, \underline{p0} \multimap p67 \otimes p63 \otimes p65 \otimes p56 \otimes p32 \otimes p30 \otimes p28 \otimes p4 \otimes p2 \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ D_{G} \longrightarrow p67 \otimes p
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           \underline{\Gamma}:\ p0\vdash p2\otimes p28\otimes p30\otimes p32\otimes p4\otimes p56\otimes p63\otimes p65\otimes p67
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                 file: MCC/CloudDeployment_deploy_2_a_10_1.p (73172 ms)
                                                                                                                                                                                       FIG. ,  \frac{\overline{\Gamma : p2 \vdash p2} \quad \overline{\Gamma : p28 \vdash p28}}{\Gamma : p2, p28 \vdash p2 \otimes p28} \otimes \frac{\overline{\Gamma : p30 \vdash p30}}{\Gamma : p30 \vdash p30} \otimes \frac{\overline{\Gamma : p32 \vdash p32}}{\overline{\Gamma : p2, p28, p30, p32 \vdash p2 \otimes p28 \otimes p30 \otimes p32}} \otimes \frac{\overline{\Gamma : p4 \vdash p4}}{\overline{\Gamma : p2, p28, p30, p32 \vdash p2 \otimes p28 \otimes p30, p32}} \otimes \frac{\overline{\Gamma : p4 \vdash p4}}{\overline{\Gamma : p2, p28, p30, p32, p4 \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4}} \otimes \frac{\overline{\Gamma : p56 \vdash p56}}{\overline{\Gamma : p63 \vdash p63}} \otimes \frac{\overline{\Gamma : p63 \vdash p63}}{\overline{\Gamma : p65 \vdash p65}} \otimes \frac{\overline{\Gamma : p65 \vdash p65}}{\overline{\Gamma : p2, p28, p30, p32, p4, p56, p63 \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63}} \otimes \frac{\overline{\Gamma : p65 \vdash p65}}{\overline{\Gamma : p67 \vdash p67}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\overline{\Gamma : p2, p28, p30, p32, p4, p56, p63, p65, p63, p65 \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65}}{\overline{\Gamma : p67 \vdash p67}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\overline{\Gamma : p67 \vdash p67}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\overline{\Gamma : p67 \vdash p67}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\overline{\Gamma : p67 \vdash p67}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\overline{\Gamma : p67 \vdash p67}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}}{\overline{\Gamma : p67 \vdash p67}}
\Gamma: p0 \vdash p0
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\frac{\overline{\Gamma\colon p2\vdash p2}}{\Gamma\colon p2} \frac{\overline{\Gamma\colon p28\vdash p28}}{\Gamma\colon p28\vdash p2} \otimes \frac{\overline{\Gamma\colon p30\vdash p30}}{\Gamma\colon p30\vdash p30} \otimes \frac{\overline{\Gamma\colon p32\vdash p32}}{\Gamma\colon p30\vdash p30} \otimes \frac{\overline{\Gamma\colon p32\vdash p32}}{\Gamma\colon p4\vdash p4} \otimes \frac{\overline{\Gamma\colon p56\vdash p56}}{\Gamma\colon p56\vdash p56} \otimes \frac{\overline{\Gamma\colon p65\vdash p65}}{\Gamma\colon p65\vdash p65} \otimes \frac{\overline{\Gamma\colon p65\vdash
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   \Gamma: p0 \vdash p0
                                                                                                                                                                                             \Gamma: \ p0, p0 \multimap p67 \otimes p63 \otimes p65 \otimes p56 \otimes p32 \otimes p30 \otimes p28 \otimes p4 \otimes p2 \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67
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                                                                                                                                                                                             MCC/CloudDeployment_deploy_2_a_20_1.p (73694 ms)
                                                                                                                                                                        \frac{\overline{\Gamma : p2 \vdash p2} \quad \overline{\Gamma : p28 \vdash p28}}{\Gamma : p2} \otimes \frac{\overline{\Gamma : p30 \vdash p30}}{\Gamma : p30 \vdash p30} \otimes \frac{\overline{\Gamma : p32 \vdash p32}}{\Gamma : p30 \vdash p30} \otimes \frac{\overline{\Gamma : p32 \vdash p32}}{\Gamma : p4 \vdash p4} \otimes \frac{\overline{\Gamma : p40 \vdash p4}}{\Gamma : p56 \vdash p56} \otimes \frac{\overline{\Gamma : p40 \vdash p4}}{\Gamma : p65 \vdash p65} \otimes \frac{\overline{\Gamma : p65 \vdash p65}}{\Gamma : p65 \vdash p65} \otimes \frac{\overline{\Gamma : p65 \vdash p65}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{\overline{\Gamma : p67 \vdash p67}}{\Gamma : p67 \vdash p67} \otimes \frac{
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\Gamma: p0 \vdash p0
                                                                                                                                                                                      \Gamma: \ p0, p0 \multimap p67 \otimes p63 \otimes p65 \otimes p56 \otimes p32 \otimes p30 \otimes p28 \otimes p4 \otimes p2 \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ D_{G} \longrightarrow p67 \otimes p67 
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                                                                                                                                                                    \frac{\overline{\Gamma\colon p2\vdash p2} \quad \overline{\Gamma\colon p28\vdash p28}}{\underline{\Gamma\colon p2,p28\vdash p2\otimes p28}} \otimes \frac{\overline{\Gamma\colon p30\vdash p30}}{\overline{\Gamma\colon p30\vdash p30}} \otimes \frac{\overline{\Gamma\colon p32\vdash p32}}{\overline{\Gamma\colon p2,p28,p30\vdash p2\otimes p28\otimes p30}} \otimes \frac{\overline{\Gamma\colon p32\vdash p32}}{\overline{\Gamma\colon p4\vdash p4}} \otimes \frac{\overline{\Gamma\colon p4\vdash p4}}{\overline{\Gamma\colon p56\vdash p56}} \otimes \frac{\overline{\Gamma\colon p65\vdash p65}}{\overline{\Gamma\colon p65\vdash p65}} \otimes \frac{\overline{\Gamma\colon p65\vdash p65}}{\overline{\Gamma\colon p67\vdash p67}} \otimes \frac{\overline{\Gamma\colon p67\vdash p67}}{\overline{\Gamma\colon p67\vdash p6
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                                                                                                                                                                                             \Gamma: \ p0, p0 \multimap p67 \otimes p63 \ \underline{\otimes p65 \otimes p56 \otimes p32 \otimes p30 \otimes p28 \otimes p4 \otimes p2} \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \ D_{C}
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                                                                                                                                                                       \frac{\overline{\Gamma \colon p2 \vdash p2} \quad \overline{\Gamma \colon p28 \vdash p28}}{\Gamma \colon p2, p28 \vdash p2 \otimes p28} \otimes \frac{\overline{\Gamma \colon p30 \vdash p30}}{\Gamma \colon p30 \vdash p30} \otimes \frac{\overline{\Gamma \colon p32 \vdash p32}}{\Gamma \colon p4 \vdash p4} \otimes \frac{\overline{\Gamma \colon p4 \vdash p4}}{\overline{\Gamma \colon p56 \vdash p56}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash p67}} \otimes \frac{\overline{\Gamma \colon p67 \vdash p67}}{\overline{\Gamma \colon p67 \vdash
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           \Gamma: \ p2, p28, p30, p32, p4, p56, p63, p65, p67 \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p3 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p67 \otimes p67 \\ + p4 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p67 \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         \Gamma: \Delta \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 
                                                                                                                                                                                             \Gamma: p0, p0 \xrightarrow{-\circ} p67 \otimes p63 \otimes p65 \otimes p56 \otimes p32 \otimes p30 \otimes p28 \otimes p4 \otimes p2 \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67 \xrightarrow{D_{G}}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         \Gamma: p0 \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              \Gamma: \ \Delta \vdash p2 \otimes p28 \otimes p30 \otimes p32 \otimes p4 \otimes p56 \otimes p63 \otimes p65 \otimes p67
                                                                                                                                                                                          MCC/CloudDeployment_deploy_2_b_1_1.p (4920 ms)
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11

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\Gamma: p1 \vdash p1 \quad \overline{\Gamma}: p552 \vdash p552
                                          \Gamma: p1, p552 \vdash p1 \otimes p552
                                            \Gamma: \Delta \vdash p1 \otimes p552
\Gamma: p0 \vdash p0
  \Gamma: p0, p0 \multimap p552 \otimes p1 \vdash p1 \otimes p552
                        \Gamma: p0 \vdash p1 \otimes p552
                        \Gamma: \Delta \vdash p1 \otimes p552 *
 file:
                      MCC/CloudDeployment_deploy_2_b_5_1.p (14653 ms)
                                                                                                                                             \frac{\overline{\Gamma:\ p266\vdash p266}\quad \overline{\Gamma:\ p3\vdash p3}}{\underline{\Gamma:\ p266,p3\vdash p266\otimes p3}}\otimes \frac{\overline{\Gamma:\ p547\vdash p547}}{\overline{\Gamma:\ p547\vdash p547}}\otimes \frac{\overline{\Gamma:\ p554\vdash p554}}{\overline{\Gamma:\ p554\vdash p554}}\otimes
                                                                                                                                                             \Gamma: p266, p3, p547, p554 \vdash p266 \otimes p3 \otimes p547 \otimes p554
                                                                                                            \Gamma: p552 \vdash p552
                                                                                                                             \frac{\Gamma: \ p266, p3, p547, p552, p552 - p554 \vdash p266 \otimes p3 \otimes p547 \otimes p554}{\Gamma: \ p366, p3, p547, p552, p552 - p554 \vdash p366 \otimes p3 \otimes p547 \otimes p554} \ D_C
                                                                                                                                    \Gamma: p266, p3, p547, p552 \vdash p266 \otimes p3 \otimes p547 \otimes p554
                                                                           \Gamma: p529 \vdash p529
                                                                                               \begin{array}{c} 1 - p_{229} & 1 - p_{220}, p_{22}, p_{222}, p_{222} \\ \Gamma : & p_{266}, p_{3}, p_{529}, p_{552}, p_{529} - p_{547} + p_{266} \otimes p_{3} \otimes p_{547} \otimes p_{554} \\ p_{C} & p_{266}, p_{3}, p_{529}, p_{552}, p_{552}, p_{552} + p_{266} \otimes p_{3} \otimes p_{547} \otimes p_{554} \\ \end{array} 
                                                                                                          \Gamma: p266, p3, p529, p552 \vdash p266 \otimes p3 \otimes p547 \otimes p554
                                                                                                           \Gamma: \Delta \vdash p266 \otimes p3 \otimes p547 \otimes p554
                                                  \Gamma: p2 \vdash p2
                                                            \Gamma: p2, p529, p552, p2 \multimap p266 \otimes p3 \vdash p266 \otimes p3 \otimes p547 \otimes p554 \ D_C
                                                                           \Gamma: p2, p529, p552 \vdash p266 \otimes p3 \otimes p547 \otimes p554
                                                                                    \Gamma: \Delta \vdash \underline{p266 \otimes p3 \otimes p547 \otimes p554}_{-\circ}
                                  \Gamma: p1, p552, p1 \multimap p529 \otimes p2 \vdash p266 \otimes p3 \otimes p3 \otimes p547 \otimes p554
                                                 \Gamma: \ p1, p552 \vdash p266 \otimes p3 \otimes p547 \otimes p554 
                                                    \Gamma: \Delta \vdash p266 \otimes p3 \otimes p547 \otimes p554 \longrightarrow
\Gamma: p0 \vdash p0
            \Gamma: p0, p0 \multimap p552 \otimes p1 \vdash p266 \otimes p3 \otimes p547 \otimes p554 D_C
                          \Gamma: p0 \vdash p266 \otimes p3 \otimes p547 \otimes p554
                          \Gamma: \Delta \vdash p266 \otimes p3 \otimes p547 \otimes p554 \star
                       MCC/CloudDeployment_deploy_3_b_1_1.p (14630 ms)
       \frac{\overline{\Gamma: p1 \vdash p1} \quad \overline{\Gamma: p855 \vdash p855}}{\overline{\Gamma: p1 \vdash p0} \quad \overline{\Gamma: p1, p855 \vdash p1 \otimes p855}} \star \\ \underline{\frac{\Gamma: p1 \vdash p1}{\Gamma: p0 \vdash p0} \quad \overline{\Gamma: \Delta \vdash p1 \otimes p855}}_{\Gamma: p0, p0 \multimap p855 \otimes p1 \vdash p1 \otimes p855} \\ \underline{\frac{\Gamma: p0, p0 \multimap p855 \otimes p1 \vdash p1 \otimes p855}{Da}}_{Da}
                                                         \Gamma: p0 \vdash p1 \otimes p855
                                                          \frac{1}{\Gamma: \Delta \vdash p1 \otimes p855} \star
```

file: MCC/CloudDeployment_deploy_3_b_5_1.p (47945 ms)

```
\Gamma: p276, p4, p548, p820, p857 \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857 
                                                                                                                                                                                      \Gamma: p855 \vdash p855
                                                                                                                                                                                                                                  \frac{\Gamma:\ p276,p4,p548,p820,p855,p855 - p857 \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857}{D_C}
                                                                                                                                                                                                                                                          \Gamma: p276, p4, p548, p820, p855 \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857
                                                                                                                                                                                                                                                                                               \Gamma: \Delta \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857 \circ
                                                                                                                                         \Gamma: p3 \vdash p3
                                                                                                                                                             \frac{1}{\Gamma}: \ p3, p548, p820, p855, p3 - p276 \otimes p4 \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857 \\ D_C
                                                                                                                                                                                      \Gamma: \ p3, p548, p820, p855 \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857
                                                                                                                                                                                                              \Gamma: \Delta \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857
                                                                                           \Gamma: p2 \vdash p2
                                                                                                         \begin{array}{c} F = F \\ \hline \Gamma : & p2, p820, p855, p2 \multimap p548 \otimes p3 \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857 \\ \hline D_C \end{array} 
                                                                                                                                    \Gamma: p2, p820, p855 \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857
                                                                                                                                                   \Gamma: \Delta \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857 _ \multimap
                                                              \frac{1}{\Gamma}: p1, p855, \underline{p1} \multimap p820 \otimes p2 \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857}_{C}
                                                                                         \Gamma: p1, p855 \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857
                                                                                                \Gamma: \ \Delta \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857 \ \_ \circ
\Gamma: p0 \vdash p0
                     \frac{p}{\Gamma}: \ p0, p0 - p855 \otimes p1 \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857} \ D_C
                                                \Gamma:\ p0 \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857
                                                            \Delta \vdash p276 \otimes p4 \otimes p548 \otimes p820 \otimes p857
   file: MCC/DES_des_00_b_1_1.p (699 ms)
                                                                       \overline{\Gamma}: p1 \vdash p1 \quad \overline{\Gamma}: p118 \vdash p118
                                                                                   \Gamma: p1, p118 \vdash p1 \otimes p118
                                                                                   \Gamma: \Delta \vdash p1 \otimes p118
\Gamma: p0 \vdash p0
    \frac{\Gamma: p0 + p0}{\Gamma: p0, p0 \multimap p118 \otimes p1 \vdash p1 \otimes p118} \longrightarrow D_C
                                                \frac{\Gamma: \ p0 \vdash p1 \otimes p118}{\Gamma: \ \Delta \vdash p1 \otimes p118}
    file:
                                              MCC/DES_des_00_b_5_1.p (3290 ms)
                                                                                                                                                                                                                                                                 \frac{\overline{\Gamma\colon p117\vdash p117} \quad \overline{\Gamma\colon p119\vdash p119}}{\Gamma\colon p119\vdash p119} \otimes \frac{\overline{\Gamma\colon p2\vdash p2}}{\Gamma\colon p117, p119\vdash p117\otimes p119} \otimes \frac{\overline{\Gamma\colon p2\vdash p2}}{\Gamma\colon p263\vdash p263} \otimes \frac{\overline{\Gamma\colon p263\vdash p263}}{\Gamma\colon p263\vdash p263} \otimes \frac{\overline{\Gamma\colon p60\vdash p60}}{\Gamma\colon p60\vdash p60} \otimes \frac{\overline{\Gamma\colon p60\vdash p60}}{\Gamma\colon p60\vdash
                                                                                                                                                                                                       \Gamma: p115 \vdash p115
                                                                                                                                                                                                                                                                                                                                     \Gamma: p117, p119, p2, p263, p60 \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60
                                                                                                                                                                                                                                                  \frac{\Gamma: \ p115, p119, p2, p263, p60, p115 \multimap p117 \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60}{p2 \otimes p263 \otimes p60} \ D_{CC}
                                                                                                                                                                                                                                                                         \Gamma: p115, p119, p2, p263, p60 \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60
                                                                                                                                                                                                                                                                                                           \Gamma: \Delta \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60
                                                                                                                                                    \Gamma: p59 \vdash p59
                                                                                                                                                                       \frac{\Gamma: \ p119, p2, p263, p59, p59 \multimap p115 \otimes p60 \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60}{D_C} D_C
                                                                                                                                                                                                      \Gamma: p119, p2, p263, p59 \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60
                                                                                                                                                                                                                             \frac{\Gamma: \ \Delta \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60}{}{} \rightarrow
                                                                                                          \frac{1}{\Gamma} : \ p118, p2, p59, p\underline{118} - p263 \otimes p119 \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60}{D_{G}} D_{G}
                                                                                                                                           \Gamma: p118, p2, p59 \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60
                                                                                                                                                         \Gamma: \ \Delta \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60 \ \_{\circ}
                                                                 \frac{\Gamma: \ p1, p118, p1 \multimap p59 \otimes p2 \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60}{D_C} \ D_C
                                                                                          \underline{\Gamma:\ p1,p118 \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60} \ \star
                                                                                                    \Gamma: \Delta \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60
\Gamma: p0 \vdash p0
                       \frac{\Gamma:}{\Gamma:} \frac{p0, p0 \multimap p118 \otimes p1 \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60}{p263 \otimes p60} D_C
                                                   \Gamma: p0 \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60
                                                \overline{\Gamma: \ \Delta \vdash p117 \otimes p119 \otimes p2 \otimes p263 \otimes p60}
    file: MCC/DES_des_01_b_1_1.p (755 ms)
                                                                      \overline{\Gamma: p1 \vdash p1} \quad \overline{\Gamma: p13 \vdash p13}
                                                                                   \Gamma: p1, p13 \vdash p1 \otimes p13 \star
                                                                       \Gamma: \Delta \vdash p1 \otimes p13
\Gamma: p0 \vdash p0
      \frac{\Gamma}{\Gamma}: \ p0, \underline{p0} \multimap p13 \otimes p1 \vdash p1 \otimes p13} \ D_C
                                              \frac{\Gamma:\ p0 \vdash p1 \otimes p13}{\Gamma:\ \Delta \vdash p1 \otimes p13} \ \star
```

file: MCC/DES_des_01_b_5_1.p (4583 ms)

```
\frac{\Gamma : p11, p132, p14, p276, p4 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4}{\Gamma : p11, p132, p14, p276, p4 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4} \times \frac{\Gamma : p9}{\Gamma : p11, p132, p14, p276, p4, p9 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\Lambda}
                                                                                                                                                                                                                                \Gamma: p3 \vdash p3
                                                                                                                                                                                                                                                    \frac{\Gamma \colon p11, p132, p14, p276, p3 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\Gamma \colon \Delta \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \star
                                                                                                                                       \Gamma: p131 \vdash p131
                                                                                                                                                      \frac{\Gamma\colon p11,p13,p14,p3\vdash p11\otimes p132\otimes p14\otimes p276\otimes p4\otimes p9}{\Gamma\colon \Delta\vdash p11\otimes p132\otimes p14\otimes p276\otimes p4\otimes p9}\star
                                                                                     \overline{\Gamma:\ p13 \vdash p13}
                                                                                                      \frac{\Gamma: p11, p13, p3, p13 \multimap p131 \otimes p14 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\Gamma: p11, p13, p3, p13 \multimap p131 \otimes p14 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \ D_C
                                                                                                                                   \Gamma: \ p11, p13, p3 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9 \xrightarrow{\star}
                                                                \frac{\vdash p1}{\Gamma \colon p1, p13, p1 \multimap p11 \otimes p3} \frac{\vdash p11, p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\Gamma \colon p1, p13, p1 \multimap p11 \otimes p3 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p1 \multimap p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p1 \multimap p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13, p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p1 \multimap p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p11 \multimap p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\vdash p11 \otimes p13 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \longrightarrow \frac{\vdash p11, p13, p11 \otimes p13 \otimes p14 \otimes p1
                                           \Gamma: p1 \vdash p1
                                                                                      \Gamma: \ p1, p13 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9
                                                                                              \Gamma: \Delta \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9
                      \frac{p}{\Gamma} : \underbrace{p0, p0 \multimap p13 \otimes p1 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9}_{C} \ D_{C}
                                               \Gamma: p0 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9
                                              \overline{\Gamma:\ \Delta \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9}
   file: MCC/DES_des_02_b_1_1.p (800 ms)
                                                                        \Gamma: p1 \vdash p1 \quad \overline{\Gamma}: p17 \vdash p17
                                                                                      \Gamma: p1, p17 \vdash p1 \otimes p17
                                                                                   \Gamma: \Delta \vdash p1 \otimes p17
\Gamma: p0 \vdash p0
       \Gamma: p0, p0 \multimap p17 \otimes p1 \vdash p1 \otimes p17
                                               \Gamma: p0 \vdash p1 \otimes p17
                                                \Gamma: \Delta \vdash p1 \otimes p17
    file: MCC/DES_des_02_b_5_1.p (4673 ms)
                                                                                                                                                                                                                                      \frac{\Gamma: \ p11, p136, p14, p18, p280, p4 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4}{\star}
                                                                                                                                                                                                                                                                                                                                                                         \Gamma: p3 \vdash p3
                                                                                                                                                                                                                              \Gamma: p136, p14, p18, p280, p3, p3 \multimap p11 \otimes p4 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4
                                                                                                                                                                                                                                                    \frac{\Gamma:\ p136,p14,p18,p280,p3 \vdash p11\otimes p136\otimes p14\otimes p18\otimes p280\otimes p4}{\star} \ \star
                                                                                                                                                                                                                                                                                     \Gamma: \Delta \vdash \underline{p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4}
                                                                                                                                     \Gamma: p135 \vdash p135
                                                                                                                                                    \frac{\Gamma \colon p135 \vdash p135}{\Gamma \colon p135, p14, p18, p3, p135} \multimap p280 \otimes p136 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4}{D_C}
                                                                                                                                                                                    \Gamma: \ p135, p14, p18, p3 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4 \\ \star
                                                                                                    \Gamma: p17 \vdash p17
                                           \Gamma: p1 \vdash p1
                                                               \Gamma: \underbrace{p1, p17, p1} \multimap p14 \otimes p3 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4}_{C} D_{C}
                                                                                      \frac{\Gamma: \ p1, p17 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4}{\star} \ \star
                                                                                          \Gamma: \Delta \vdash \underline{p11} \otimes \underline{p136} \otimes \underline{p14} \otimes \underline{p18} \otimes \underline{p280} \otimes \underline{p4}
                      \frac{\Gamma:}{\Gamma:} p0, p0 \multimap p17 \otimes p1 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} D_C
                                             \frac{\Gamma:\ p0 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4}{\Gamma:\ \Delta \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \star
  file: MCC/DES_des_05_b_1_1.p (877 ms)
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\Gamma: p1 \vdash p1 \quad \overline{\Gamma}: p29 \vdash p29
                                                                                               \Gamma: p1, p29 \vdash p1 \otimes p29
                                                                                                   \Gamma: \Delta \vdash p1 \otimes p29
\Gamma: p0 \vdash p0
        \Gamma: p0, p0 \multimap p29 \otimes p1 \vdash p1 \otimes p29
                                                    \Gamma: p0 \vdash p1 \otimes p29
                                                     \Gamma: \Delta \vdash p1 \otimes p29 *
    file: MCC/DES_des_05_b_5_1.p (5271 ms)
                                                                                                                                                                                                                                                                \frac{\overline{\Gamma \colon p148 \vdash p148} \quad \overline{\Gamma \colon p17 \vdash p17}}{\underline{\Gamma \colon p148, p17 \vdash p148 \otimes p17}} \otimes \frac{\overline{\Gamma \colon p23 \vdash p23}}{\overline{\Gamma \colon p148, p17 \vdash p148 \otimes p17 \otimes p23}} \otimes \frac{\overline{\Gamma \colon p292 \vdash p292}}{\overline{\Gamma \colon p292 \vdash p292}} \otimes \frac{\overline{\Gamma \colon p30 \vdash p30}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p44}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{\overline{\Gamma \colon p44 \vdash p4}}{\overline{\Gamma \colon p44 \vdash p4}} \otimes \frac{
                                                                                                                                                                                                                                                                                                                                                                     \frac{\Gamma: \ p148, p17, p23, p292, p30, p4 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4}{} \star
                                                                                                                                                                                                                                                                                                                                                                                                                 \Gamma: \Delta \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4 \multimap
                                                                                                                                                                                                                  \Gamma: p3 \vdash p3
                                                                                                                                                                                                                                                     \Gamma: p148, p23, p292, p3, p30 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4
                                                                                                                                                    \Gamma: p147 \vdash p147
                                                                                                                                                                                                                                                                                                                \Gamma: \Delta \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4 \multimap
                                                                                                                                                                      \Gamma: \ p147, p23, p3, p30, p147 \multimap p292 \otimes p148 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4
D_{C}
                                                                                                                                                                                                        \frac{\Gamma:\ p147,p23,p3,p30 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4}{\Gamma:\ \Delta\vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \star
                                                                                              \Gamma: p29 \vdash p29
                                                                                                                \frac{\Gamma: \ p23, p29, p3, p29}{\cap} \circ p147 \otimes p30 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \ D_C
                                                                                                                                               \Gamma: p23, p29, p3 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4
                                                                                                                                                                \Gamma: \Delta \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4
                                                                       \Gamma: p1, p29 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4
                                                                                                        \Gamma: \Delta \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4
                              : p0, p0 \multimap p29 \otimes p1 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4 \xrightarrow{} D_C
                                                  \frac{\Gamma:\ p0 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4}{\Gamma:\ \Delta \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \ \star
     file: MCC/DES_des_10_b_1_1.p (1171 ms)
                                                                                \overline{\Gamma: p1 \vdash p1} \quad \overline{\Gamma: p49 \vdash p49}
                                                                                               \Gamma: p1, p49 \vdash p1 \otimes p49
\Gamma: p0 \vdash p0
                                                                               \Gamma: \Delta \vdash p1 \otimes p49
        \Gamma: p0, p0 \multimap p49 \otimes p1 \vdash p1 \otimes p49
                                                    \frac{\Gamma: \ p0 \vdash p1 \otimes p49}{\Gamma: \ \Delta \vdash p1 \otimes p49} \ \star
   file: MCC/DES_des_10_b_5_1.p (6703 ms)
                                                                                                                                                                                                                                                               \underline{\Gamma}: \ p168, p27, p312, p38, p4, p50 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50
                                                                                                                                                                                                   \Gamma: p167 \vdash p167
                                                                                                                                                                                                                                      \frac{-p167}{\Gamma \colon \ p167, p27, p38, p4, p50, p167 \multimap p312 \otimes p168 \bowtie p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50}{\Gamma \colon \ p167, p27, p38, p4, p50 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} D_C 
                                                                                                                                                                                                                                                                                                        \Gamma: \Delta \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50
                                                                                                                                                                   \frac{\Gamma: \ p27, p38, p4, p49, p49 \multimap p167 \otimes p50 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50}{\Gamma: \ p27, p38, p4, p49 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \underbrace{D_C}_{b}
                                                                                                                   \frac{1 \cdot p_{21}, p_{30}, p_{3}, p_{49} + p_{40} \otimes p_{-1} \otimes p_{40} \otimes p_{4} \otimes p_{50}}{\Gamma : p_{3}, p_{38}, p_{49}, p_{3} - p_{27} \otimes p_{4} + p_{168} \otimes p_{27} \otimes p_{312} \otimes p_{38} \otimes p_{4} \otimes p_{50}}{\Gamma : p_{3}, p_{38}, p_{49}, p_{3} - p_{27} \otimes p_{4} + p_{168} \otimes p_{27} \otimes p_{312} \otimes p_{38} \otimes p_{4} \otimes p_{50}} \xrightarrow{O}
                                                                                                                                            \frac{\Gamma:\ p3,p38,p49 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50}{\star}
                                                                                                                                                            \Gamma: \ \Delta \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50
                                                                   \frac{\Gamma: \ p1, p49, p1 \multimap p38 \otimes p3 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50}{D_{C}}
                                                                                           \underline{\Gamma:\ p1,p49\vdash p168\otimes p27\otimes p312\otimes p38\otimes p4\otimes p50}\ \star
                                                                                                    \Gamma: \Delta \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50
                        \frac{\Gamma}{\Gamma}: \ p0, p0 - \underline{p49 \otimes p1} \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50}{D_C}
                                                \frac{\Gamma:\ p0 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50}{\Gamma:\ \Delta \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \star
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MCC/DES_des_20_b_1_1.p (1653 ms)
                              \Gamma: p1 \vdash p1 \quad \overline{\Gamma: p89 \vdash p89}
                                   \Gamma: p1, p89 \vdash p1 \otimes p89
                             \Gamma: \Delta \vdash p1 \otimes p89
\Gamma: p0 \vdash p0
  \frac{\Gamma: p0 + p0}{\Gamma: p0, p0 \multimap p89 \otimes p1 \vdash p1 \otimes p89} D_C
                   \frac{\Gamma: \ p0 \vdash p1 \otimes p89}{\Gamma: \ \Delta \vdash p1 \otimes p89} \ \star
 file:
                  MCC/DES_des_20_b_5_1.p (8575 ms)
                                                                                               \Gamma: p208, p352, p4, p47, p68, p90 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90
                                                                                                                                                      \Gamma: \Delta \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90 -\circ
                                                                         \Gamma: p207 \vdash p207
                                                                                      \Gamma: \Delta \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90
                                                             \frac{\Gamma: p4, p47, p68, p89, p89 \multimap p207 \otimes p90 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90}{D_C} D_C
                                                                        \frac{\Gamma \colon p4, p46, p68, p89 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90}{\Gamma \colon \Delta \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \star
                                          \frac{1}{\Gamma}: p3, p68, p89, p3 \rightarrow p47 \otimes p4 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90}{PC}
                                            \frac{\Gamma:\ p3,p68,p89 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90}{} \star
                         \underline{\Gamma:\ p1,p89 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \ \star
                                     \Gamma: \Delta \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90
\Gamma: p0 \vdash p0
         \Gamma: p0, p0 \multimap p89 \otimes p1 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90
                  \frac{\Gamma: \ p0 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90}{\Gamma: \ \Delta \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \star
 file: MCC/DES_des_30_b_1_1.p (2247 ms)
                              \overline{\Gamma}: p1 \vdash p1 \quad \overline{\Gamma}: p128 \vdash p128
                                   \Gamma: p1, p128 \vdash p1 \otimes p128
\Gamma: \overline{p0 \vdash p0}
                                    \Gamma: \ \Delta \vdash p1 \otimes p128
 \Gamma: p0, p0 \multimap p128 \otimes p1 \vdash p1 \otimes p128 
D_C
                    \frac{\Gamma: \ p0 \vdash p1 \otimes p128}{\Gamma: \ \Delta \vdash p1 \otimes p128} \ \star
                   \texttt{MCC/DES\_des\_30\_b\_5\_1.p} \hspace{0.2cm} \texttt{(10376 ms)}
 file:
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\Gamma: \ p129, p246, p35, p5, p66, p97 \vdash p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97
                                                                                                                                                                                                                                                                                                                                                            \Gamma: \Delta \vdash \underline{p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97}_{-\circ}
                                                                                                                                                                                                                   \Gamma: \ p129, p246, p4, p66, p97, p4 \multimap p35 \otimes p5 \vdash p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97
D_{C}
                                                                                                                                                                                                                                         \Gamma: p129, p246, p4, p66, p97 \vdash p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97
                                                                                                                                                                                                                                                                       \Gamma: \ \Delta \vdash p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97
                                                                                                                                                          \frac{1}{\Gamma}: \frac{p129, p246, p3, p97, p3 - o p66 \otimes p4 \vdash p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97}{2} D_{C}
                                                                                                                                                                                \Gamma: \ p129, p246, p3, p97 \vdash p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97
                                                                                             \begin{array}{c|c} & 1: p128, p240, p3, p91 \vdash p128 \otimes p240 \otimes p90 
                                                                                  \Gamma: p128 \vdash p128
                                                           \frac{\Gamma : \ p128, p3, p97, p128 - o \ p240 \otimes p129 + p120 \otimes p246 \otimes p35 \otimes p56 \otimes p66 \otimes p97}{\Gamma : \ p128, p3, p97 \vdash p129 \otimes p246 \otimes p35 \otimes p56 \otimes p66 \otimes p97} \star \\ \frac{\Gamma : \ p1, p128, p1 - o \ p97 \otimes p3 \vdash p129 \otimes p246 \otimes p35 \otimes p56 \otimes p66 \otimes p97}{\Gamma : \ p1, p128, p1 - o \ p97 \otimes p3 \vdash p129 \otimes p246 \otimes p35 \otimes p56 \otimes p66 \otimes p97} \\ D_{C}
                                        \Gamma: p1 \vdash p1
                                                                                 \frac{\Gamma: \ p1, p128 \vdash p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97}{\star} \ \star
                                                                                           \Gamma: \Delta \vdash p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97 \multimap
\Gamma: p0 \vdash p0
                     \frac{1}{\Gamma} : \underbrace{p0, p0 - op128 \otimes p1 \vdash p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97}_{C} D_{C}
                                              \Gamma: p0 \vdash p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97
                                              \frac{\Gamma: \Delta \vdash p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97}{\Gamma: \Delta \vdash p129 \otimes p246 \otimes p35 \otimes p5 \otimes p66 \otimes p97} \star
                                            MCC/DES_des_40_b_1_1.p (2595 ms)
                                                                      \Gamma: p1 \vdash p1 \quad \overline{\Gamma: p168 \vdash p168}
                                                                                   \Gamma: p1, p168 \vdash p1 \otimes p168
                                                                                        \Gamma: \Delta \vdash p1 \otimes p168
    \Gamma: p0, p0 \multimap p168 \otimes p1 \vdash p1 \otimes p168 
D_C
                                                \Gamma: p0 \vdash p1 \otimes p168
                                                \Gamma: \Delta \vdash p1 \otimes p168
  file: MCC/DES_des_40_b_5_1.p (13025 ms)
                                                                                                                                                                                                                        \Gamma: p4 \vdash p4
                                                                                                                                                                                                                                    \Gamma: p127, p169, p286, p4, p86 \vdash p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86
                                                                                                                                                                                                                                                                     \Gamma: \Delta \vdash p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86 
                                                                                                                                                      \Gamma: \ p127, p169, p286, p3, p3 \multimap p86 \otimes p4 \vdash p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86 \\ D_C
                                                                                                                                                                            \Gamma: \ p127, p169, p286, p3 \vdash p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86 
                                                                                                                                                                                                     \Gamma: \Delta \vdash p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86
                                                                                           \frac{\Gamma: \ p127, p168, p3, p168 - p286 \otimes p169 \vdash p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86}{\Gamma: \ p127, p168, p3 \vdash p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86} D_C}
                                                         \frac{1 + p1}{\Gamma \colon p1, p168, p1 - p127 \otimes p3 + p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86} }{\Gamma \colon p1, p168, p1 - p127 \otimes p3 + p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86} \choose{D_C} - \frac{1}{C}
                                        \Gamma: p1 \vdash p1
                                                                                \frac{\Gamma : p1, p168 \vdash p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86}{\Gamma : \Delta \vdash p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86} \times 
                     \frac{\Gamma: p0, p0 \multimap p168 \otimes p1 \vdash p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86}{D_C} D_C
                                             \Gamma: p0 \vdash p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86
                                             \Gamma: \ \Delta \vdash p127 \otimes p169 \otimes p286 \otimes p45 \otimes p5 \otimes p86
                                            MCC/DES_des_50_b_1_1.p (3177 ms)
                                                                      \Gamma: p1 \vdash p1 \quad \overline{\Gamma}: p208 \vdash p208
                                                                                    \Gamma: p1, p208 \vdash p1 \otimes p208
\Gamma: p0 \vdash \overline{p0}
                                                                                         \Gamma: \ \Delta \vdash p1 \otimes p208
     \Gamma: p0, p0 \multimap p208 \otimes p1 \vdash p1 \otimes p208
                                                \Gamma: p0 \vdash p1 \otimes p208
                                                \frac{1}{\Gamma: \ \Delta \vdash p1 \otimes p208} \ \star
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 \frac{\overline{\Gamma \colon p106 \vdash p106 \quad \Gamma \colon p157 \vdash p157}}{\Gamma \colon p106, p157 \vdash p106 \otimes p157} \otimes \frac{\overline{\Gamma \colon p209 \vdash p209}}{\Gamma \colon p106, p157, p209 \vdash p106 \otimes p157 \otimes p209} \otimes \frac{\overline{\Gamma \colon p326 \vdash p326}}{\Gamma \colon p326 \vdash p326} \otimes \frac{\overline{\Gamma \colon p55 \vdash p5}}{\Gamma \colon p55 \vdash p5} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p55}}{\Gamma \colon p55 \vdash p55} \otimes \frac{\overline{\Gamma \colon p55 \vdash p
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           \frac{\Gamma: \ p106, p157, p209, p326, p5, p55 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55}{\Gamma: \ \Delta \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} \star \\ \frac{\Gamma: \ \Delta \vdash p106, p157, p209, p326, p5, p55}{\Gamma: \ \Delta \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} \\ \xrightarrow{\bullet}
                                                                                                                                                                                                                                                                                                                                                                     \Gamma: p4 \vdash p4
                                                                                                                                                                                                                                                                                                                                                                                                                                                     p106, p157, p209, p326, p4, p4 \multimap p55 \otimes p5 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55 \\ D_C
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           \frac{\Gamma: \; p106, p157, p209, p320, p4, p4 \multimap p3 \otimes p0 \vdash p100 \otimes p320 \otimes p5 \otimes p55}{\Gamma: \; p106, p157, p209, p326, p4 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} \times \frac{\Gamma: \; \Delta \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55}{2000 \otimes p320 \otimes p326 \otimes p5 \otimes p55}
                                                                                                                                                                                                                                                                                    \Gamma: p3 \vdash p3
                                                                                                                                                                                                                                                                                                               \frac{\Gamma: \ p157, p209, p3, p326, p3 \multimap p106 \otimes p4 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55}{DC}
                                                                                                                                                                                           Γ : p208 ⊢ p208
                                                                                                                                                                                                                                                          \Gamma: \ p157, p208, p3 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55 
                                                                                                                                                                                                                                                                                           \frac{\Gamma: \ \Delta \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55}{} \ \bigcirc
                                                                                   \Gamma: p1 \vdash p1
                                                                                                                  \frac{\Gamma: \ p1, p208, p1 \multimap p157 \otimes p3 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55}{\Gamma: \ p1, p208, p1 \multimap p157 \otimes p3 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} \ D_C
                                                                                                                                                                     \underline{\Gamma}: \ p1, p208 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55 \\ \star
                                                                                                                                                                                               \begin{array}{c} P^{2,1} \\ : \Delta \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55 \\ \hline \\ - \circ \end{array} 
\Gamma: p0 \vdash p0
                                       \Gamma: p0, p0 \multimap p208 \otimes p1 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55 
                                                                                              \Gamma: p0 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55
                                                                                          \frac{\Gamma: \ \Delta \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p59}{\Gamma: \ \Delta \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} \star
     file: MCC/DES_des_60_b_1_1.p (3800 ms)
                                                                                                                                               \overline{\Gamma}: p1 \vdash p1 \quad \overline{\Gamma}: p248 \vdash p248
                                                                                                                                                                        \Gamma: p1, p248 \vdash p1 \otimes p248
                                                                                                                                                                                   \Gamma: \ \Delta \vdash p1 \otimes p248
 \Gamma: p0 \vdash p0
          \Gamma: p0, p0 \multimap p248 \otimes p1 \vdash p1 \otimes p248
                                                                                                  \frac{\Gamma: p0 \vdash p1 \otimes p248}{\Gamma: \Delta \vdash p1 \otimes p248}
         file:
                                                                                            MCC/DES_des_60_b_5_1.p (17502 ms)
                                                                                                                                                                                                                                                                                                                                                                                                                                                     \frac{\overline{\Gamma \colon p126 \vdash p126} \quad \overline{\Gamma \colon p187 \vdash p187}}{\Gamma \colon p126, p187 \vdash p126 \otimes p187} \otimes \frac{\overline{\Gamma \colon p249 \vdash p249}}{\overline{\Gamma \colon p126, p187, p249 \vdash p126 \otimes p187 \otimes p249}} \otimes \frac{\overline{\Gamma \colon p366 \vdash p366}}{\overline{\Gamma \colon p366 \vdash p366}} \otimes \frac{\overline{\Gamma \colon p5 \vdash p5}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p65}}{\overline{\Gamma \colon p65 \vdash p65}} \otimes \frac{\overline{\Gamma \colon p65 \vdash p6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           \frac{\Gamma : \ p126, p187, p249, p366, p5, p65 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65}{\Gamma : \ \Delta \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \star
                                                                                                                                                                                                                                                                                                                                                                         \Gamma: p4 \vdash p4
                                                                                                                                                                                                                                                                                                                                                                                                                                     \Gamma: \ p126, p187, p249, p366, p4, p4 \multimap p65 \otimes p5 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65 \\ D_{C}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             \frac{\Gamma: \ p126, p187, p249, p366, p4 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65}{\star}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              \Gamma: \ \Delta \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65 \ \_{\circ}
                                                                                                                                                                                                                                                                                                               \frac{\Gamma: \ p187, p249, p3, p366, p3 \multimap p126 \otimes p4 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65}{D_C} \ D_C
                                                                                                                                                                                                                                                                                                                                                              \Gamma: \ p187, p249, p3, p366 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65 \\ \star
                                                                                                                                                                                           \Gamma: p248 \vdash p248
                                                                                                                                                                                                                                                        \Gamma: p187, p248, p3 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65
                                                                                                                      \frac{1 : p_{101}, p_{240}, p_{01} : p_{120} \otimes p_{130} \otimes p_{240} \otimes p_{240}}{\Gamma : p_{1}, p_{248}, p_{1} - \circ p_{187} \otimes p_{3} + p_{126} \otimes p_{187} \otimes p_{249} \otimes p_{366} \otimes p_{5} \otimes p_{65}}{\rho_{5}} \xrightarrow{C} \frac{1}{\rho_{5}} \frac{1}{\rho_{
                                                                                   \Gamma: p1 \vdash p1
                                                                                                                                                                     \frac{\Gamma: p1, p248 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65}{\star} \star
                                                                                                                                                                                       \Gamma : p0 \vdash p0
                                           \frac{\Gamma: p0, p0 \multimap p248 \otimes p1 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65}{D_C} D_C
                                                                                              \Gamma: p0 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65
                                                                                          \Gamma: \Delta \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65
                                                                                              MCC/DatabaseWithMutex_database2UNFOLD_100_1.p (732 ms)
         file:
                                                                                              MCC/DatabaseWithMutex_database2UNFOLD_10_1.p (248 ms)
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MCC/DES_des_50_b_5_1.p (14970 ms)

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file:
                                                      {\tt MCC/DatabaseWithMutex\_database2UNFOLD\_1\_1.p~(510~ms)}
                                                                                                                                                                                                  \Gamma: \ \Delta \vdash Mutex\_1 \otimes Mutex\_2 \otimes WaitMutex\_1\_2 \otimes all\_'active\_2 \otimes all\_'passive\_1 \otimes all\_'passive\_1 \otimes all\_'passive\_1 \otimes all\_'passive\_2 \otimes all\_'passive\_1 \otimes all\_'passive\_2 \otimes all\_'passive\_3 \otimes all\_'passiv
file:
                                                       MCC/DatabaseWithMutex_database2UNFOLD_20_1.p (701 ms)
file:
                                                      MCC/DatabaseWithMutex_database2UNFOLD_50_1.p (263 ms)
 file: MCC/DatabaseWithMutex_database2UNFOLD_5_1.p (861 ms)
file:
                                                      MCC/Diffusion2D_2D8_gradient_10x10_10_1_1.p (17383 ms)
                                                       MCC/Diffusion2D_2D8_gradient_10x10_10_5_1.p (21486 ms)
 file:
                                                      MCC/Diffusion2D_2D8_gradient_5x5_10_1_1.p (3563 ms)
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file: MCC/ERK_erk-000001_100_1.p (161 ms)
\frac{\overline{\Gamma : ERK \vdash ERK} \quad \overline{\Gamma : MEKPP \vdash MEKPP}}{\Gamma : ERK, MEKPP \vdash ERK \otimes MEKPP} \otimes \quad \overline{\Gamma : RKIP \vdash RKIP}
                                                   \underline{\Gamma : \ ERK, MEKPP, RKIP, RP \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP} \ \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   \overline{\Gamma: Raf1'Star} \vdash Raf1'Star
                                                                                                                                                   \Gamma: ERK, MEKPP, RKIP, RP, Raf1'Star \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP \otimes Raf1'Star
                                                                                                                                                                                                                                                                            \Gamma: \Delta \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP \otimes Raf1'Star
     file: MCC/ERK_erk-000001_10_1.p (147 ms)
 \Gamma: ERK \vdash ERK  \Gamma: MEKPP \vdash MEKPP
                 \frac{ERK + ERK - 1 \cdot MEKFF - MEKFF}{\Gamma \colon ERK, MEKPP \vdash ERK \otimes MEKPP} \otimes \frac{\Gamma \colon RKIP \vdash RKIP}{\Gamma \colon RKIP \vdash RKIP}
                                                    \frac{\Gamma : ERK, MEKPP, RKIP \vdash ERK \otimes MEKPP \otimes RKIP}{\Gamma : RP \vdash RP} \otimes \frac{\Gamma : RP \vdash RP}{\Gamma : RP \vdash RP}
                                                                                                \frac{RK, MEKPP, RKIP \vdash ERK \otimes MEKI \vdash \otimes RKIP}{\Gamma \colon ERK, MEKPP, RKIP, RP \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP} \otimes \frac{\Gamma \colon Raf1'Star \vdash Raf1'Star}{\otimes}
                                                                                                                                                   \Gamma: ERK, MEKPP, RKIP, RP, Raf1'Star \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP \otimes Raf1'Star
                                                                                                                                                                                                                                                                             \Gamma: \ \Delta \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP \otimes Raf1'Star
     file: MCC/ERK_erk-000001_1_1.p (111 ms)
                                                                                                                                                                                                                                                                                           \frac{\overline{ERK} \vdash \overline{ERK}}{\Gamma \colon \overline{MEKPP} \vdash \overline{MEKPP}} \otimes \frac{\Gamma \colon \overline{RP} \vdash \overline{RP}}{\Gamma \colon \overline{RP} \vdash \overline{RP}} \otimes \frac{\Gamma \colon \overline{RP} \vdash \overline{RP}}{\Gamma \colon \overline{Raf1'Star\_'RKIP} \vdash \overline{Raf1'Star\_'RKIP}} \otimes \frac{\Gamma \colon \overline{Raf1'Star\_'RKIP} \vdash \overline{Raf1'Star\_'RKIP}}{\Gamma \colon \overline{Raf1'Star\_'RKIP} \vdash \overline{Raf1'Star\_'RKIP}} \otimes \frac{\Gamma \colon \overline{Raf1'Star\_'RKIP} \vdash \overline{Raf1'Star\_'RKIP}}{\Gamma \colon \overline{Raf1'Star\_'RKIP}} \otimes \frac{\Gamma \colon \overline{Raf1'Star\_'RKIP}
\Gamma: Raf1'Star \vdash Raf1'Star \quad \Gamma: RKIP \vdash RKIP \otimes
                                                                                                                                                                                                                                                                                                                                        \Gamma \colon \mathit{ERK}, \mathit{MEKPP}, \mathit{RP}, \mathit{Raf}\underline{1'\mathit{Star}\underline{\,'}\mathit{RKIP}} \vdash \mathit{ERK} \otimes \mathit{MEKPP} \otimes \mathit{RP} \otimes \mathit{Raf}\underline{1'\mathit{Star}\underline{\,'}\mathit{RKIP}} \xrightarrow{} \neg \circ
               \Gamma: RKIP, Raf1'Star \vdash Raf1'Star \otimes RKIP
                                                                       \Gamma : ERK, MEKPP, RKIP, RP, Raf1'Star, Raf1'Star \otimes RKIP \rightarrow Raf1'Star\_'RKIP \vdash ERK \otimes MEKPP \otimes RP \otimes Raf1'Star\_'RKIP \\ D_{C}
                                                                                                                                                                              \Gamma : ERK, MEKPP, RKIP, RP, Raf1'Star \vdash ERK \otimes MEKPP \otimes RP \otimes Raf1'Star\_'RKIP
                                                                                                                                                                                                                                                                        \Gamma : \Delta \vdash ERK \otimes MEKPP \otimes RP \otimes Raf1'Star\_'RKIP
      file: MCC/ERK_erk-000001_20_1.p (146 ms)
\frac{\overline{\Gamma : ERK \vdash ERK} \quad \overline{\Gamma : MEKPP \vdash MEKPP}}{\Gamma : ERK, MEKPP \vdash ERK \otimes MEKPP} \otimes \quad \overline{\Gamma : RKIP \vdash RKIP}
                                                   \frac{\Gamma : ERK, MEKPP, RKIP \vdash ERK \otimes MEKPP \otimes RKIP}{\Gamma : RP \vdash RP} \otimes \frac{\Gamma : RP \vdash RP}{\Gamma : RP \vdash RP}
                                                                                                 \frac{RK, MEKPP, RKIP \vdash EKK \otimes MEKPP \otimes RKIP}{\Gamma \colon ERK, MEKPP, RKIP, RP \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP} \otimes \frac{\Gamma \colon Raf1'Star \vdash Raf1'Star}{\Gamma \colon Raf1'Star} \otimes \frac{RK, MEKPP, RKIP, RP \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP}{RKIP \otimes RP} \otimes \frac{RKIP \otimes RP}{RAf1'Star} \otimes \frac{RK, MEKPP, RKIP, RP \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP}{RKIP \otimes RP} \otimes \frac{RKIP \otimes RP}{RAf1'Star} \otimes \frac{RK, MEKPP, RKIP, RP \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP}{RKIP \otimes RP} \otimes \frac{RKIP \otimes RP}{RKIP \otimes RP} \otimes \frac{
                                                                                                                                                   \Gamma: ERK, MEKPP, RKIP, RP, Raf1'Star \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP \otimes Raf1'Star
                                                                                                                                                                                                                                                                            \overline{\Gamma:\ \Delta \vdash ERK \otimes MEKPP \otimes RK}IP \otimes RP \otimes Raf1'Star
     file: MCC/ERK_erk-000001_50_1.p (151 ms)
 \overline{\Gamma: ERK \vdash ERK} \quad \overline{\Gamma: MEKPP \vdash MEKPF}
                 \frac{1}{\Gamma}: ERK, MEKPP \vdash ERK \otimes MEKPP \otimes \frac{1}{\Gamma}: RKIP \vdash RKIF
                                                    \Gamma: ERK, MEKPP, RKIP \vdash ERK \otimes MEKPP \otimes RKIP \otimes \Gamma: RP \vdash RP
                                                                                                 \frac{\Gamma \colon ERK, MEKPP, RKIP \vdash EKK \otimes MEKPP \otimes RKIP \otimes RP}{\Gamma \colon ERK, MEKPP, RKIP, RP \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP} \otimes \frac{\Gamma \colon Raf1'Star \vdash Raf1'Star}{\Gamma \colon Raf1'Star} \otimes \frac{\Gamma \colon Raf1'Star \vdash Raf1'Star}{\Gamma \colon Raf1'Star} \otimes \frac{\Gamma \colon Raf1'S
                                                                                                                                                    \Gamma: ERK, MEKPP, RKIP, RP, Raf1'Star \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP \otimes Raf1'Star
                                                                                                                                                                                                                                                                            \Gamma: \Delta \vdash ERK \otimes MEKPP \otimes RKIP \otimes RP \otimes Raf1'Star
                                                                   MCC/ERK_erk-000001_5_1.p (103 ms)
                                                                                                                                                                                                                                                                       \frac{\overline{\Gamma \colon ERK \vdash ERK} \quad \overline{\Gamma \colon MEKPP \vdash MEKPP}}{\Gamma \colon ERK, MEKPP \vdash ERK \otimes MEKPP} \otimes \quad \overline{\Gamma \colon RP \vdash RP}}{\overline{\Gamma \colon Raf1'Star\_'RKIP} \vdash Raf1'Star\_'RKIP}} \otimes \frac{\overline{\Gamma \colon Raf1'Star\_'RKIP} \vdash Raf1'Star\_'RKIP}}{\overline{\Gamma \colon Raf1'Star\_'RKIP}} \otimes \frac{\overline{\Gamma \colon Raf1'Star\_'RKIP}}{\overline{\Gamma \colon Raf1'Star\_'RKIP}}} \otimes \frac{\overline{\Gamma \colon Raf1'Star\_'RKIP}}{\overline{\Gamma \colon Raf1'Star\_'RKIP}} \otimes \frac{\overline{\Gamma \colon Raf1'Star\_'RKIP}}{\overline{\Gamma \colon Raf1'Star\_'RKIP}
\Gamma: Raf1'Star \vdash Raf1'Star \quad \Gamma: RKIP \vdash RKIP \otimes
                                                                                                                                                                                                                                                                                                                                        \Gamma : \textit{ERK}, \textit{MEKPP}, \textit{RP}, \textit{Raf1'Star\_'RKIP} \vdash \textit{ERK} \otimes \textit{MEKPP} \otimes \textit{RP} \otimes \textit{Raf1'Star\_'RKIP}
              \Gamma: RKIP, Raf1'Star \vdash Raf1'Star \otimes RKIP
                                                                       \Gamma : ERK, MEKPP, RKIP, RP, Raf1'Star, Raf1'Star \otimes RKIP \rightarrow Raf1'Star_{RKIP} \vdash ERK \otimes MEKPP \otimes RP \otimes Raf1'Star_{RKIP} \xrightarrow{D_{G}} D_{G}
                                                                                                                                                                                \Gamma: ERK, MEKPP, RKIP, RP, Raf1'Star \vdash ERK \otimes MEKPP \otimes RP \otimes Raf1'Star\_'RKIP
                                                                                                                                                                                                                                                                       \Gamma: \Delta \vdash ERK \otimes MEKPP \otimes RP \otimes Raf1'Star\_'RKIP
```

file: MCC/Eratosthenes_eratosthenes-010_1_1.p (21361 ms)

```
\frac{\overline{\Gamma \colon p10 \vdash p10} \quad \overline{\Gamma \colon p2 \vdash p2}}{\frac{\Gamma \colon p10, p2 \vdash p10 \otimes p2}{}} \otimes \frac{\Gamma \colon p3 \vdash p3}{} \otimes \frac{\Gamma \colon p4 \vdash p4}{} \otimes \frac{\Gamma \colon p4 \vdash p4}{} \otimes \frac{\Gamma \colon p5 \vdash p5}{} \\ \frac{\overline{\Gamma \colon p10, p2, p3 \vdash p10 \otimes p2 \otimes p3} \otimes p4}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4 \vdash p10 \otimes p2 \otimes p3 \otimes p4}{} \otimes \frac{\Gamma \colon p5 \vdash p5}{} \otimes \frac{\Gamma \colon p7 \vdash p7}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7} \otimes \frac{\Gamma \colon p8 \vdash p8}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8}{} \otimes \frac{\Gamma \colon p9 \vdash p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p8, p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8 \otimes p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p8, p9 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8 \otimes p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p8, p9 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8 \otimes p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p8, p9 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8 \otimes p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p8, p9 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8 \otimes p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p8, p9 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8 \otimes p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p8, p9 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8 \otimes p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p8, p9 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8 \otimes p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p8, p9 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8 \otimes p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p8, p9 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8 \otimes p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p8, p9 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8 \otimes p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p3, p4, p5, p7, p8, p9 \vdash p10 \otimes p2 \otimes p3 \otimes p4 \otimes p5 \otimes p7 \otimes p8 \otimes p9}{} \otimes \frac{\Gamma \colon p10, p2, p3, p4, p5, p7, p3, p4, p5, p
\Gamma: p2 \vdash \underline{p2} \quad \underline{\Gamma: p6 \vdash p6} \otimes
            \Gamma: p2, p6 \vdash p2 \otimes p6
                                                            MCC/Eratosthenes_eratosthenes-010_5_1.p (6028 ms)
                                                                                                                                                                                                                                                                                                                                                      \Gamma: p4 \vdash p4 \quad \overline{\Gamma: p2 \vdash p2} \otimes
                                                                                                                                                                                                                                                                                                                                   \Gamma: p2, p4 \vdash p4 \otimes p2
                                                                                                                                                                                                                    \Gamma: p2 \vdash p2 \qquad \overline{\Gamma: p8 \vdash p8} \otimes
                                                                                                                                                                                                                                  ': p2, p8 ⊢ p2 ⊗ p8

\underline{\Gamma: p2 \vdash p2} \quad \underline{\Gamma: p6 \vdash p6} \otimes \\

                                                                          \frac{1: p2, p6 \vdash p2 \otimes p6}{\text{p10}} \otimes \frac{\frac{1: p2, p6 \vdash p2 \otimes p6}{\Gamma: p2, p3, p4, p5, p7, p8, p9, p2 \otimes p8 \multimap p2 \vdash p2 \otimes p3 \otimes p5 \otimes p7}{\Gamma: p2, p3, p4, p5, p7, p8, p9 \vdash p2 \otimes p3 \otimes p5 \otimes p7} \multimap \frac{\Gamma: p2, p3, p4, p5, p6, p7, p8, p9, p2 \otimes p6 \multimap p2 \vdash p2 \otimes p3 \otimes p5 \otimes p7}{\Gamma: p2, p3, p4, p5, p6, p7, p8, p9 \vdash p2 \otimes p3 \otimes p5 \otimes p7} \multimap \frac{\Gamma: p2, p3, p4, p5, p6, p7, p8, p9 \vdash p2 \otimes p3 \otimes p5 \otimes p7}{\Gamma: p10, p2, p3, p4, p5, p6, p7, p8, p9 \vdash p2 \otimes p3 \otimes p5 \otimes p7} \multimap \frac{D_C}{\Gamma: p10, p2, p3, p4, p5, p6, p7, p8, p9 \vdash p2 \otimes p3 \otimes p5 \otimes p7} \multimap \frac{\Gamma: p10, p2, p3, p4, p5, p6, p7, p8, p9 \vdash p2 \otimes p3 \otimes p5 \otimes p7}{\Gamma: p10, p2, p3, p4, p5, p6, p7, p8, p9 \vdash p2 \otimes p3 \otimes p5 \otimes p7} \times \frac{\Gamma: p10, p2, p3, p4, p5, p6, p7, p8, p9 \vdash p2 \otimes p3 \otimes p5 \otimes p7}{\Gamma: p10, p2, p3, p4, p5, p6, p7, p8, p9 \vdash p2 \otimes p3 \otimes p5 \otimes p7} \times \frac{\Gamma: p2, p3, p4, p5, p6, p7, p8, p9 \vdash p2 \otimes p3 \otimes p5 \otimes p7}{\Gamma: p10, p2, p3, p4, p5, p6, p7, p8, p9 \vdash p2 \otimes p3 \otimes p5 \otimes p7}}
                                                                                                                                                                                                                                                                                       \frac{\Gamma:\ p2,p3,p4,p5,p7,p8,p9,p2\otimes p8\multimap p2\vdash p2\otimes p3\otimes p5\otimes p7}{D_C}\ D_C
 \Gamma: p2 \vdash p2 \Gamma: p10 \vdash p10 \otimes
         \Gamma: p10, p2 \vdash p2 \otimes p10
     file: MCC/FlexibleBarrier_flexbar_04_a_100_1.p (86923 ms)
                                                                                                                                                                                                                                                                                                                                             \Gamma: p48 \vdash p48
                                                                                      \Gamma: p12 \vdash p12
 \Gamma : p0 \vdash p0
                                                                                                                                                      \Gamma:\ \Delta \vdash p11 \otimes p24 \otimes p34 \otimes p46 \otimes p49 \otimes p50
  \begin{array}{c} 1: p_0 \vdash p_0 \\ \hline \Gamma: p_0, p_0 \multimap p_{50} \otimes p_{49} \otimes p_{48} \otimes p_{36} \otimes p_{24} \otimes p_{12} \vdash p_{11} \otimes p_{24} \otimes p_{34} \otimes p_{46} \otimes p_{49} \otimes p_{50} \\ \hline D_C \end{array} 
                                                                           \frac{\Gamma:\ p0 \vdash p11 \otimes p24 \otimes p34 \otimes p46 \otimes p49 \otimes p50}{\Gamma:\ \Delta \vdash p11 \otimes p24 \otimes p34 \otimes p46 \otimes p49 \otimes p50}\ \star
                                                            MCC/FlexibleBarrier_flexbar_04_a_10_1.p (88452 ms)
                                                                                                                                                                                                                                                                           \begin{array}{c} \frac{\Gamma\colon p11+p11\ \Gamma\colon p24+p24}{\Gamma\colon p11,p24+p11\otimes p24} \otimes \frac{\Gamma\colon p34+p34}{\Gamma\colon p34+p34} \otimes \frac{\Gamma\colon p46+p46}{\Gamma\colon p11,p24,p34+p11\otimes p24\otimes p34} \otimes \frac{\Gamma\colon p46+p46}{\Gamma\colon p11,p24,p34+p11\otimes p24\otimes p34\otimes p46} \otimes \frac{\Gamma\colon p49+p49}{\Gamma\colon p11,p24,p34+p46+p11\otimes p24\otimes p34\otimes p46\otimes p49} \otimes \frac{\Gamma\colon p50+p50}{\Gamma\colon p11,p24,p34,p46,p49+p11\otimes p24\otimes p34\otimes p46\otimes p49} \otimes \frac{\Gamma\colon p50+p50}{\Gamma\colon p11,p24,p34,p46,p49+p11\otimes p24\otimes p34\otimes p46\otimes p49\otimes p50} \otimes \frac{\Gamma\colon p11,p24,p34,p47,p49,p50,p47-op46+p11\otimes p24\otimes p34\otimes p46\otimes p49\otimes p50}{\Gamma\colon p11,p24,p34,p47,p49,p50+p11\otimes p24\otimes p34\otimes p46\otimes p49\otimes p50} O_{C} \\ \frac{\Gamma\colon p11,p24,p34,p47,p49,p50+p11\otimes p24\otimes p34\otimes p46\otimes p49\otimes p50}{\Gamma\colon p11,p24,p34,p47,p49,p50+p11\otimes p24\otimes p34\otimes p46\otimes p49\otimes p50} O_{C} \\ \frac{\Gamma\colon p11,p24,p34,p47,p49,p50+p11\otimes p24\otimes p34\otimes p46\otimes p49\otimes p50}{\Gamma\colon p11,p24,p34,p48,p49,p50+p11\otimes p24\otimes p34\otimes p46\otimes p49\otimes p50} O_{C} \end{array}
                                                                                                                                                                                                                            Γ : p48 ⊢ p48
                                                                                                                                                                                                                                                                                                    \begin{array}{c|c} \Gamma : p0 \vdash p0 & \Gamma : \Delta \vdash p11 \otimes p24 \otimes p34 \otimes p46 \otimes p49 \otimes p50 \\ \hline \Gamma : p0, p0 \multimap p50 \otimes p49 \otimes p48 \otimes p36 \otimes p24 \otimes p12 \vdash p11 \otimes p24 \otimes p34 \otimes p46 \otimes p49 \otimes p50 \\ \hline D_C \end{array} 
                                                                           \frac{\Gamma : \ p0 \vdash p11 \otimes p24 \otimes p34 \otimes p46 \otimes p49 \otimes p50}{\Gamma : \ \Delta \vdash p11 \otimes p24 \otimes p34 \otimes p46 \otimes p49 \otimes p50} \star
                                                            MCC/FlexibleBarrier_flexbar_04_a_1_1.p (800 ms)
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```
\frac{\overline{\Gamma: p12 \vdash p12} \quad \overline{\Gamma: p24 \vdash p24}}{\Gamma: p12, p24 \vdash p12 \otimes p24} \otimes \overline{\Gamma: p36 \vdash p36}
                                                                                                                                                                                                                                                                            \Gamma: p48 \vdash p48
                                                                                       \Gamma: p12, p24, p36 \vdash p12 \otimes p24 \otimes p36
                                                                                                                                                                                                                                                                                                                                                        \Gamma: p49 \vdash p49
                                                                                                                  \Gamma: p12, p24, p36, p48 \vdash p12 \otimes p24 \otimes p36 \otimes p48
                                                                                                                                                 \Gamma: p12, p24, p36, p48, p49 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p49
                                                                                                                                                                               \Gamma: p12, p24, p36, p48, p49, p50 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p49 \otimes p50
\Gamma: p0 \vdash p0
                                                                                                                                                                                                                             \Gamma: \Delta \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p49 \otimes p50
                            \begin{array}{c} \vdash p \circ \\ \hline \Gamma : p0, p0 \multimap p50 \otimes p49 \otimes p48 \otimes p36 \otimes p24 \otimes p12 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p49 \otimes p50 \\ \hline D_C \end{array} 
                                                                                                              \Gamma: p0 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p49 \otimes p50
                                                                                                              \overline{\Gamma: \Delta \vdash p} 12 \otimes p24 \otimes p36 \otimes p48 \otimes p49 \otimes p50
                                       MCC/FlexibleBarrier_flexbar_04_a_20_1.p (2209 ms)
                                                                                                                                                                                \frac{\overline{\Gamma} \colon p11 \vdash p11 \quad \overline{\Gamma} \colon p24 \vdash p24}{\Gamma \colon p11, p24 \vdash p11 \otimes p24} \otimes \frac{\overline{\Gamma} \colon p34 \vdash p34}{\Gamma \colon p34 \vdash p34} \otimes
                                                                                                                                                                                                                                                                                                                                       \frac{\Gamma \colon p48 \vdash p48}{\Gamma \colon p49 \vdash p49} \otimes \frac{}{\Gamma \colon p49 \vdash p49} \otimes \frac{}{\Gamma \colon p50 \vdash p50} \otimes
                                                                                                                                                                                                        \Gamma: p11, p24, p34 \vdash p11 \otimes p24 \otimes p34
                                                                                                                                                                                                                           \underline{\Gamma: p11, p24, p34, p48 \vdash p11} \otimes p24 \otimes p34 \otimes p48
                                                                                                                                                                                                                                                 \Gamma: \ p11, p24, p34, p48, p49 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49
                                                                                                                                                                                                                                                                       \Gamma: p11, p24, p34, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                                                                                                                   \Gamma: p35 \vdash p35
                                                                                                                                                                                      \Gamma: \ p11, p24, \underline{p35}, p48, p49, p50, \underline{p35} \multimap p34 \vdash \underline{p11} \otimes \underline{p24} \otimes \underline{p34} \otimes \underline{p48} \otimes \underline{p49} \otimes \underline{p50} \quad D_C
                                                                                                                                                                                                    \Gamma: p11, p24, p35, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                                                                     \Gamma: p36 \vdash p36
                                                                                                                            \Gamma: \ \underline{p11}, \underline{p24}, \underline{p36}, \underline{p48}, \underline{p49}, \underline{p50}, \underline{p36} - \underline{p35} \vdash \underline{p11} \otimes \underline{p24} \otimes \underline{p34} \otimes \underline{p48} \otimes \underline{p49} \otimes \underline{p50} \quad \underline{D_C}
                                                                                                                                           \Gamma: p11, p24, p36, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                       \Gamma: p12 \vdash p12
                                                                                    p12, p24, p36, p\underline{48, p49, p50, p12} - \circ p11 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50 \\ D_C
                                                                                          \Gamma: p12, p24, p36, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                                                                                                            \Gamma: \Delta \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50 \multimap
\Gamma: p0 \vdash p0
   \Gamma: p0, p0 \rightarrow p50 \otimes p49 \otimes p48 \otimes p36 \otimes p24 \otimes p12 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                                              \Gamma: p0 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                                              \Gamma: \ \Delta \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                       MCC/FlexibleBarrier_flexbar_04_a_50_1.p (2205 ms)
                                                                                                                                                                               \frac{\overline{\Gamma\colon p11\vdash p11}\quad \overline{\Gamma\colon p24\vdash p24}}{\Gamma\colon p11, p24\vdash p11\otimes p24}\otimes \frac{}{\Gamma\colon p34\vdash p34}\otimes \frac{}{\Gamma\colon p34\vdash p34}\otimes \frac{}{\Gamma\colon p48\vdash p48}\otimes \frac{}{\Gamma\colon p49\vdash p49}\otimes \frac{}{\Gamma\colon p49\vdash p49}\otimes \frac{}{\Gamma\colon p50\vdash p50}\otimes \frac{}{}
                                                                                                                                                                                                                                                                       \frac{7}{\Gamma} : \ p11, p24, p34, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50}{}_{-\diamond}
                                                                                                                                   \Gamma: p35 \vdash p35
                                                                                                                                                                                     \Gamma: p11, p24, p35, p48, p49, p50, p35 \multimap p34 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
D_C
                                                                                                                                                                                                    \Gamma: p11, p24, p35, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                                                                                                            \Gamma: \ p11, p24, p36, p48, p49, p50, p36 \multimap p35 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50 \\ D_C
                                                                                                                                           \frac{1}{\Gamma}: \ p11, p24, p36, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50}{1} = \frac{1}{\Gamma}
                                       \Gamma: p12 \vdash p12
                                                                                   \Gamma: p12, p24, p36, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                                                                                                            \Gamma: \Delta \vdash \underline{p11} \otimes \underline{p24} \otimes \underline{p34} \otimes \underline{p48} \otimes \underline{p49} \otimes \underline{p50}
  \Gamma: p0, p0 \rightarrow p50 \otimes p49 \otimes p48 \otimes p36 \otimes p24 \otimes p12 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                                             \frac{\Gamma: \ p0 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50}{\Gamma: \ \Delta \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50} \ \star
   file:
                                        MCC/FlexibleBarrier_flexbar_04_a_5_1.p (2219 ms)
                                                                                                                                                                               \frac{\overline{\Gamma\colon p11\vdash p11}\quad \overline{\Gamma\colon p24\vdash p24}}{\Gamma\colon p11, p24\vdash p11\otimes p24}\otimes \frac{}{\Gamma\colon p34\vdash p34}\otimes \frac{}{\Gamma\colon p48\vdash p48}\otimes \frac{}{\Gamma\colon p48\vdash p48}\otimes \frac{}{\Gamma\colon p49\vdash p49}\otimes \frac{}{\Gamma\colon p50\vdash p50}\otimes \frac{}{\Gamma\colon p50\vdash p50}
                                                                                                                                   \Gamma: p35 \vdash p35
                                                                                                                                                                                                                                                                       \Gamma: p11, p24, p34, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                                                                                                                                                                       \Gamma: \ p11, p24, p35, p48, p49, p50, p35 \multimap p34 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                                                                                                                                                                                    \frac{\Gamma: \ p11, p24, \underline{p35, p48, p49, p50} \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50}{}_{- \Diamond}
                                                                                     \Gamma: p36 \vdash p36
                                                                                                                            \Gamma: \ p11, p24, p3\underline{6}, p48, p49, p50, p36 \multimap p35 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50 \\ D_{C}
                                                                                                                                            \Gamma: p11, p24, p36, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                       \Gamma: p12 \vdash p12
                                                                          \Gamma: \underbrace{p12, p24, p36, p48, p49, p50, p12 \multimap p11 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50}_{DC} D_{C}
                                                                                          \Gamma: p12, p24, p36, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                                                                                                           \Gamma: \Delta \vdash \underline{p11} \otimes \underline{p24} \otimes \underline{p34} \otimes \underline{p48} \otimes \underline{p49} \otimes \underline{p50}
\Gamma: p0 \vdash p0
  \Gamma: p0, p0 \rightarrow p50 \otimes p49 \otimes p48 \otimes p36 \otimes p24 \otimes p12 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50 
                                                              \Gamma: p0 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
                                                              \Gamma: \ \Delta \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50
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file: MCC/FlexibleBarrier_flexbar_04_b_1_1.p (873 ms)

```
\overline{\Gamma: p1 \vdash p1} \quad \overline{\Gamma: p203 \vdash p203}
                                                                                                         \Gamma: p1, p203 \vdash p1 \otimes p203
                                                                                                           \Gamma: \Delta \vdash p1 \otimes p203
\Gamma: p0 \vdash p0
     \frac{\Gamma: p0 + p0}{\Gamma: p0, p0 \multimap p203 \otimes p1 \vdash p1 \otimes p203} \longrightarrow D_C
                                                             \overline{\Gamma:\ p0\vdash p1}\otimes p203
                                                              \overline{\Gamma: \Delta \vdash p1 \otimes p203}
    file:
                                                          MCC/FlexibleBarrier_flexbar_04_b_5_1.p (2722 ms)
                                                                                                                                                                                                                                                                                                                                                                                                                                                     \overline{\Gamma: p1 \vdash p1} \quad \overline{\Gamma: p255 \vdash p255}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              \overline{\Gamma}: p\underline{266 \vdash p266} \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  \Gamma: p1, p255 \vdash p1 \otimes p255
                                                                                                                                                                                                                                                                                                                                                         \Gamma: p267 \vdash p267
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          \Gamma: p1, p255, p266 \vdash p1 \otimes p255 \otimes p266
                                                                                                                                                                                                                                                                                                                                                                                         \Gamma: p1, p255, p267, p267 \multimap p266 \vdash p1 \otimes p255 \otimes p266
                                                                                                                                                                                                                                                                                                                                                                                                                        \Gamma: p1, p255, p267 \vdash p1 \otimes p255 \otimes p266
                                                                                                                                                                                                                                                            \Gamma: p256 \vdash p256
                                                                                                                                                                                                                                                                                                         \frac{\Gamma: \ p1, p255, p256, p256, p256 \multimap p267 \vdash p1 \otimes p255 \otimes p266}{\Gamma: \ p1, p255, p256, p256 \multimap p267} \ D_C
                                                                                                                                                                                                                                                                                                                                      \Gamma: p1, p255, p256 \vdash p1 \otimes p255 \otimes p266
                                                                                                                                                                 \Gamma: p204 \vdash p204
                                                                                                                                                                                                                    \frac{\Gamma : \ p1, p204, p256, p204 \multimap p255 \vdash p1 \otimes p255 \otimes p266}{P204 \multimap p255} \ D_C
                                                                                                                                                                                                                                                       \Gamma: p1, p204, p256 \vdash p1 \otimes p255 \otimes p266
                                                                     \Gamma: p203 \vdash p203
                                                                                                                                                                                                                                                                                 \Gamma: \ \Delta \vdash p1 \otimes p255 \otimes p266
                                                                                                       \Gamma: p1, p203, p203 \rightarrow p256 \otimes p204 \vdash p1 \otimes p255 \otimes p266 
                                                                                                                                                             \Gamma: p1, p203 \vdash p1 \otimes p255 \otimes p266
                                                                                                                                                                           \Gamma: \ \Delta \vdash p1 \otimes p255 \otimes p266
 \Gamma: p0 \vdash p0
                                           \Gamma: p0, p0 \xrightarrow{-\circ p203 \otimes p1 \vdash p1 \otimes p255 \otimes p266} D_C
                                                                                      \Gamma: p0 \vdash p1 \otimes p255 \otimes p266
                                                                                      \Gamma: \Delta \vdash p1 \otimes p255 \otimes p266
     file:
                                                          MCC/FlexibleBarrier_flexbar_06_a_1_1.p (14357 ms)
                                                          \frac{\overline{\Gamma: p12 \vdash p12} \quad \overline{\Gamma: p24 \vdash p24}}{\overline{\Gamma: p12 \vdash p12} \otimes p24} \otimes \frac{\overline{\Gamma: p36 \vdash p36}}{\overline{\Gamma: p36 \vdash p36}} \otimes \frac{\overline{\Gamma: p48 \vdash p48}}{\overline{\Gamma: p48 \vdash p48}} \otimes \frac{\overline{\Gamma: p60 \vdash p60}}{\overline{\Gamma: p60 \vdash p60}} \otimes \frac{\overline{\Gamma:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               \overline{\Gamma}:\ \underline{p72\vdash p72}\ \otimes
                                                                                                                                                               \Gamma: p12, p24, p36, p48, p60 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 \frac{\overline{\Gamma \colon p73 \vdash p73}}{} \otimes \underbrace{\frac{\overline{\Gamma \colon p74 \vdash p74}}{}} \otimes
                                                                                                                                                                                                   \Gamma: p12, p24, p36, p48, p60, p72 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60 \otimes p72
                                                                                                                                                                                                                                      \Gamma: p12, p24, p36, p48, p60, p72, p73 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60 \otimes p72 \otimes p73
                                                                                                                                                                                                                                                                         \Gamma: \Delta \vdash p12 \otimes p24 \underline{\otimes p36} \otimes p48 \underline{\otimes p60} \otimes p72 \underline{\otimes p73} \underline{\otimes p74}
\Gamma: p0 \vdash p0
                                                  \overset{?}{\Gamma} : \ p0, p0 \multimap p74 \otimes p73 \underbrace{\otimes p72 \otimes p60 \otimes p48 \otimes p36 \otimes p24 \otimes p12 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60 \otimes p72 \otimes p73 \otimes p74}_{C} \ D_{C} 
                                                                                                                                                                          \Gamma: p0 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60 \otimes p72 \otimes p73 \otimes p74
                                                                                                                                                                       \frac{1}{\Gamma:\ \Delta \vdash p12\otimes p24\otimes p36\otimes p48\otimes p60\otimes p72\otimes p73\otimes p74} \star
                                                          MCC/FlexibleBarrier_flexbar_06_a_5_1.p (33351 ms)
                                                                                                                                                                                                                 \frac{\Gamma \colon p10 \vdash p10 \quad \Gamma \colon p24 \vdash p24}{\Gamma \colon p10, p24, p36 \vdash p10 \otimes p24 \otimes p36} \otimes \frac{\Gamma \colon p48 \vdash p48}{\Gamma \colon p10, p24, p36 \vdash p10 \otimes p24 \otimes p36} \otimes \frac{\Gamma \colon p48 \vdash p48}{\Gamma \colon p10, p24, p36, p48, p50 \vdash p10 \otimes p24 \otimes p36 \otimes p48} \otimes \frac{\Gamma \colon p59 \vdash p59}{\Gamma \colon p10, p24, p36, p48, p59 \vdash p10 \otimes p24 \otimes p36 \otimes p48 \otimes p59} \otimes \frac{\Gamma \colon p72 \vdash p72}{\Gamma \colon p10, p24, p36, p48, p59, p72 \vdash p10 \otimes p24 \otimes p36 \otimes p48 \otimes p59 \otimes p72} \otimes \frac{\Gamma \colon p73 \vdash p73}{\Gamma \colon p10, p24, p36, p48, p59, p72 \vdash p10 \otimes p24 \otimes p36 \otimes p48 \otimes p59 \otimes p72} \otimes \frac{\Gamma \colon p73 \vdash p73}{\Gamma \colon p10, p24, p36, p48, p59, p72 \vdash p10 \otimes p24 \otimes p36 \otimes p48 \otimes p59 \otimes p72 \otimes p73} \otimes \frac{\Gamma \colon p74 \vdash p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74 \vdash p10 \otimes p24 \otimes p36 \otimes p48 \otimes p59 \otimes p72 \otimes p73 \otimes p74} \otimes \frac{\Gamma \colon p74 \vdash p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74 \vdash p10 \otimes p24 \otimes p36 \otimes p48 \otimes p59 \otimes p72 \otimes p73 \otimes p74} \otimes \frac{\Gamma \colon p74 \vdash p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74 \vdash p10 \otimes p24 \otimes p36 \otimes p48 \otimes p59 \otimes p72 \otimes p73 \otimes p74} \otimes \frac{\Gamma \colon p74 \vdash p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74 \vdash p10 \otimes p24, p36 \otimes p48 \otimes p59 \otimes p72 \otimes p73 \otimes p74} \otimes \frac{\Gamma \colon p74 \vdash p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74 \vdash p10 \otimes p24, p36 \otimes p48 \otimes p59 \otimes p72 \otimes p73 \otimes p74} \otimes \frac{\Gamma \colon p74 \vdash p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74 \vdash p10 \otimes p24, p36 \otimes p48 \otimes p59 \otimes p72 \otimes p73 \otimes p74} \otimes \frac{\Gamma \colon p74 \vdash p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74 \vdash p10 \otimes p24, p36 \otimes p48 \otimes p59 \otimes p72 \otimes p73 \otimes p74} \otimes \frac{\Gamma \colon p74 \vdash p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74 \vdash p10 \otimes p24, p36 \otimes p48 \otimes p59 \otimes p72 \otimes p73 \otimes p74} \otimes \frac{\Gamma \colon p74 \vdash p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74 \vdash p10 \otimes p24, p36 \otimes p48 \otimes p59 \otimes p72 \otimes p73 \otimes p74} \otimes \frac{\Gamma \colon p74 \vdash p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74 \vdash p10 \otimes p24, p36 \otimes p48 \otimes p59 \otimes p72 \otimes p73 \otimes p74} \otimes \frac{\Gamma \colon p74 \vdash p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74} \otimes \frac{\Gamma \colon p74 \vdash p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74} \otimes \frac{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74} \otimes \frac{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74}{\Gamma \colon p10, p24, p36, p48, p59, p72, p73, p74, p49, p48, p59, p72, p73, p74} \otimes \frac{\Gamma \colon p10, p44, p46, p48, p48, p48, p48, p48, p48
                                                                                                  Γ: p12 ⊢ p12
       \Gamma: p0 \vdash p0
  \overbrace{\Gamma: p0, p0 - p74 \otimes p73 \otimes p72 \otimes p60 \otimes p48 \otimes p36 \otimes p24 \otimes p12}^{\quad \quad -0} \stackrel{-0}{p10 \otimes p24 \otimes p36 \otimes p48 \otimes p59 \otimes p72 \otimes p73 \otimes p74}^{\quad \quad -0} \stackrel{-0}{p0} 
                                                                                          \frac{\Gamma:\ p0\vdash p10\otimes p24\otimes p36\otimes p48\otimes p59\otimes p72\otimes p73\otimes p74}{\Gamma:\ \Delta\vdash p10\otimes p24\otimes p36\otimes p48\otimes p59\otimes p72\otimes p73\otimes p74}
     file:
                                                          MCC/FlexibleBarrier_flexbar_06_b_1_1.p (4345 ms)
```

```
\Gamma: p1 \vdash p1 \quad \overline{\Gamma: p397 \vdash p397}
                                     \Gamma: p1, p397 \vdash p1 \otimes p397
                                     \overline{\Gamma: \ \Delta \vdash p1 \otimes p397}
\Gamma: p0 \vdash p0
  \frac{\Gamma: p0 + p0}{\Gamma: p0, p0 \multimap p397 \otimes p1 \vdash p1 \otimes p397} \longrightarrow_{D_C}
                     \overline{\Gamma: p0} \vdash p1 \otimes p397
                      \Gamma: \Delta \vdash p1 \otimes p397
                    MCC/FlexibleBarrier_flexbar_06_b_5_1.p (14439 ms)
                                                                                                                               \frac{\overline{\Gamma: p278 \vdash p278} \quad \overline{\Gamma: p3 \vdash p3}}{\underline{\Gamma: p278, p3 \vdash p278 \otimes p3}} \otimes \quad \overline{\Gamma: p395 \vdash p395}
                                                                                                                                            \Gamma: p278, p3, p395 \vdash p278 \otimes p3 \otimes p395
                                                                                                                                                     \Gamma: p278, p3, p395, p397 \vdash p278 \otimes p3 \otimes p395 \otimes p397
                                                                                                     \frac{\Gamma: \ p278, p3, p396, p397, p396 \multimap p395 \vdash p278 \otimes p3 \otimes p395 \otimes p397}{\Gamma: \ p278, p3, p396, p397, p396 \multimap p395 \vdash p278 \otimes p3 \otimes p395 \otimes p397} \ D_C
                                                                                                                        \frac{\Gamma: \ p278, p3, p396, p397 \vdash p278 \otimes p3 \otimes p395 \otimes p397}{}_{-\circ}
                                                                                    \frac{\Gamma: \ p278, p3, p346, p397, p346 - p396 + p278, p3}{\Gamma: \ p278, p3, p346, p397, p346 - p396 + p278, p3, p395 \otimes p397} D_C
                                                                                                \Gamma: p278, p3, p346, p397 \vdash p278 \otimes p3 \otimes p395 \otimes p397
                                                                                                           \frac{\Gamma: \ \Delta \vdash p278 \otimes p3 \otimes p395 \otimes p397}{\square} \  \, - \circ
                                                       \frac{p}{\Gamma} : \frac{p2, p346, p397, p2 \multimap p278 \otimes p3 \vdash p278 \otimes p395 \otimes p395 \otimes p397}{p397} \ D_C 
                                                                    \Gamma: p2, p346, p397 \vdash p278 \otimes p3 \otimes p395 \otimes p397
                                                                           \Gamma: \Delta \vdash p278 \otimes p3 \otimes p395 \otimes p397
                      \Gamma: p1 \vdash p1
                               \Gamma: p1, p397, p1 \multimap p346 \otimes p2 \vdash p278 \otimes p3 \otimes p395 \otimes p397
                                             \Gamma: p1, p397 \vdash p278 \otimes p3 \otimes p395 \otimes p397
                                                \Gamma: \Delta \vdash p278 \otimes p3 \otimes p395 \otimes p397 \quad \_ \circ
          \Gamma: p0, p0 \multimap p397 \otimes p1 \vdash p278 \otimes p3 \otimes p395 \otimes p397  D_C
                        \Gamma: p0 \vdash p278 \otimes p3 \otimes p395 \otimes p397
                        \frac{1}{\Gamma: \ \Delta \vdash p278 \otimes p3 \otimes p395 \otimes p397} \ \star
  file: MCC/FlexibleBarrier_flexbar_08_b_1_1.p (13618 ms)
                               \overline{\Gamma: p1 \vdash p1} \quad \overline{\Gamma: p655 \vdash p655}
                                     \underline{\Gamma}: \overline{p1, p655} \vdash p1 \otimes p655
                                      \Gamma: \Delta \vdash p1 \otimes p655
\Gamma: p0 \vdash p0
  \frac{\Gamma: p0, p0 \multimap p655 \otimes p1 \vdash p1 \otimes p655}{\Gamma: p0, p0 \multimap p655 \otimes p1 \vdash p1 \otimes p655} D_C
                     \Gamma: p0 \vdash p1 \otimes p655
                     \Gamma: \Delta \vdash p1 \otimes p655
                    MCC/FlexibleBarrier_flexbar_08_b_5_1.p (38236 ms)
                                                                                                                                                          \frac{\Gamma: p1 \vdash p1}{\Gamma: p1, p656 \vdash p1 \otimes p656} \otimes \frac{\Gamma: p917 \vdash p917}{\Gamma: p1, p656 \vdash p1 \otimes p656} \otimes \frac{\Gamma: p917 \vdash p917}{\Gamma: p1, p656, p917 \vdash p1 \otimes p656 \otimes p917} \otimes
                                                                                                                                     \frac{1}{\Gamma}: p1, p656, p918, p918 \multimap p917 \vdash p1 \otimes p656 \otimes p917}{D_{C}}
                                                                                                                                     \frac{\Gamma: \ p1, p656, p918 \vdash p1 \otimes p656 \otimes p917}{}_{-\circ}
                                                                                                         \Gamma: p1, p656, p919, p919 \rightarrow p918 \vdash p1 \otimes p656 \otimes p917 \atop D_C
                                                                                                                   \Gamma: p1, p656, p919 \vdash p1 \otimes p656 \otimes p917
                                                         \Gamma: p908 \vdash p908
                                                                          \frac{\Gamma: \ p1, p656, p908, p908 \multimap p919 \vdash p1 \otimes p656 \otimes p917}{D_{C}}
                                                                                       \frac{\Gamma:\ p1, p656, p908 \vdash p1 \otimes p656 \otimes p917}{\star}
                                                                                              \Gamma: \Delta \vdash p1 \otimes p656 \otimes p917
                        \Gamma: p655 \vdash p655
                                    \frac{1}{\Gamma}: \ p1, p655, p655 - p908 \otimes p656 \vdash p1 \otimes p656 \otimes p917}{D_C}
                                                       \Gamma: p1, p655 \vdash p1 \otimes p656 \otimes p917 \star
                                                           \Gamma: \Delta \vdash p1 \otimes p656 \otimes p917
\Gamma: p0 \vdash p0
               \Gamma: p0 \vdash p1 \otimes p656 \otimes p917
                              \frac{1}{\Gamma: \ \Delta \vdash p1 \otimes p656 \otimes p917} \ \star
```

```
MCC/FlexibleBarrier_flexbar_10_b_1_1.p (34087 ms)
                                     \overline{\Gamma: p1 \vdash p1} \quad \overline{\Gamma: p977 \vdash p977}
                                            \Gamma: p1, p977 \vdash p1 \otimes p977
                                    \Gamma: \ \Delta \vdash p1 \otimes p977
\Gamma: p0 \vdash p0
  \underline{\Gamma:\ p0,p0\multimap p977\otimes p1\vdash p1\otimes p977}
                         \frac{\Gamma: p0 \vdash p1 \otimes p977}{\Gamma: \Delta \vdash p1 \otimes p977} \star
 file: MCC/HouseConstruction-002_10_1.p (10044 ms)
                                                                                                                                             \begin{array}{c} p1, p1, p1 - p2 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8 \\ \hline \Gamma \colon p1, p1 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8 \\ \hline \Gamma \colon \Delta \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8 \\ \hline \Gamma \colon \Delta \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8 \end{array} \star
  file: MCC/HouseConstruction-002_1_1.p (58 ms)
                                     \Gamma: p1 \vdash p1 \quad \overline{\Gamma}: p2 \vdash p2
\frac{\Gamma: \ p1 \vdash p1}{\Gamma: \ p1, p2 \vdash p1 \otimes p2}
         \frac{\Gamma: p1, p1, p1 \multimap p2 \vdash p1 \otimes p2}{\Gamma: p1, p1 \vdash p1 \otimes p2} \xrightarrow{\Gamma: p1, p1 \vdash p1 \otimes p2} D_C
\frac{\Gamma: p1, p1 \vdash p1 \otimes p2}{\Gamma: \Delta \vdash p1 \otimes p2} \star
  file: MCC/HouseConstruction-002_5_1.p (210 ms)
                                                                                                                                                           \frac{\overline{\Gamma:\ p3\vdash p3}\quad \overline{\Gamma:\ p4\vdash p4}}{\Gamma:\ p3,p4\vdash p3\otimes p4}\ \otimes\ \frac{}{\Gamma:\ p5\vdash p5}
                                                                                                                                                                              \frac{3, p4 \vdash p3 \otimes p4}{\Gamma : p3, \underline{p4, p5} \vdash p3 \otimes p4 \otimes p5} \otimes \frac{\Gamma : p6 \vdash p6}{\Gamma : p6 \vdash p6} \otimes
                                                                                                                                                                                             \Gamma: p3, p4, p5, p6 \vdash p3 \otimes p4 \otimes p5 \otimes p6
                                                                                                                                                                                                       \Gamma: \Delta \vdash p3 \otimes p4 \otimes p5 \otimes p6
                                                                                                                                        \frac{p_3 + p_3}{\Gamma} : p_3, p_3, p_3 \multimap p_6 \otimes p_4 \otimes p_5 \vdash p_3 \otimes p_4 \otimes p_5 \otimes p_6}{D_C}
                                                                                                                                        \Gamma: p3, p3 \vdash p3 \otimes p4 \otimes p5 \otimes p6
                                                                                             \Gamma: p2 \vdash p2
                                                                                                                   \frac{p_2}{\Gamma}: \ \underline{p_2, p_3, p_2 \multimap p_3 \vdash p_3 \otimes p_4 \otimes p_5 \otimes p_6} \ D_C
                                                                                                                           \Gamma: p2, p3 \vdash p3 \otimes p4 \otimes p5 \otimes p6
                                                                           \frac{\Gamma:\ p2,p2,p2\multimap p3\vdash p3\otimes p4\otimes p5\otimes p6}{\Gamma:\ p2,p2\vdash p3\otimes p4\otimes p5\otimes p6}\ D_C
                               \overline{\Gamma:\ p1\vdash p1}
                    \frac{\frac{\Gamma : p1, p1, p2, p1 \multimap p2 \vdash p3 \otimes p4 \otimes p5 \otimes p6}{\Gamma : p1, p2, p1 \multimap p2 \vdash p3 \otimes p4 \otimes p5 \otimes p6}}{\frac{\Gamma : p1, p1, p1 \multimap p2 \vdash p3 \otimes p4 \otimes p5 \otimes p6}{\Gamma : p1, p1, p1 \multimap p2 \vdash p3 \otimes p4 \otimes p5 \otimes p6}} \bigcirc D_C
                                  \Gamma: \ \Delta \vdash p3 \otimes p4 \otimes p5 \otimes p6
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MCC/HouseConstruction-005_1_1.p (126 ms)
                                                                                  \frac{\overline{\Gamma:\ p1\vdash p1}\quad \overline{\Gamma:\ p1\vdash p1}}{\frac{\Gamma:\ p1,p1\vdash p1\otimes p1}{\Gamma:\ p1,p1\vdash p1\otimes p1}}\otimes \frac{\overline{\Gamma:\ p1\vdash p1}\quad \overline{\Gamma:\ p1\vdash p1}}{\Gamma:\ p1,p1\vdash p1\otimes p1}\otimes \frac{\overline{\Gamma:\ p1\vdash p1}}{\Gamma:\ p1,p1\vdash p1\otimes p1}\otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        \overline{\Gamma: \ \underline{p2 \vdash p2}} \ \otimes
                                                                                                                                                                   \overline{\Gamma:\ p1,p1,p1,p1,p2\vdash p1\otimes p1\otimes p1\otimes p1\otimes p2}
\Gamma: p1 \vdash p1
                                                                      \Gamma: p1, p1, p1, p1, p1, p1, p1 \multimap p2 \vdash p1 \otimes p1 \otimes p1 \otimes p1 \otimes p2
                                                                                                 \Gamma: p1, p1, p1, p1, p1 \vdash p1 \otimes p1 \otimes p1 \otimes p1 \otimes p2
                                                                                                                                           \Gamma: \ \Delta \vdash p1 \otimes p1 \otimes p1 \otimes p1 \otimes p2
                                             MCC/HouseConstruction-005_5_1.p (266 ms)
                                                                                                                                                                                                                                                            \Gamma: p2 \vdash p2
                                                                                                                                                                                                                                                                \Gamma: p1, p1, p2, p2, p3, \underline{p2} \multimap p3 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3
                                                                                                                                                                                                                                                                       \Gamma: p1, p1, p2, p2, p3 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3
                                                                                                                                                         \Gamma: p2 \vdash p2
                                                                                                                                                                                                   \frac{\Gamma: p1, p1, p2, p2, p2, p2, p2 \longrightarrow p3 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3}{\Gamma: p1, p1, p2, p2, p2, p2 \longrightarrow p3 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} \ D_C
                                                                                                      \Gamma: p1 \vdash p1
                                                                                                                                                                                                                  \Gamma: p1, p1, p2, p2, p2 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3
                                                                                                                                           \frac{\Gamma:\ p1,p1,p1,p2,p2,p1\multimap p2\vdash p1\otimes p1\otimes p2\otimes p3\otimes p3}{\Gamma:\ p1,p1,p1,p2,p2\vdash p1\otimes p1\otimes p2\otimes p3\otimes p3}\ D_C
                                                  \overline{\Gamma: p1 \vdash p1}
                                                                                      \frac{\Gamma: \ p1, p1, p1, p1, p2, p1 \multimap p2 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3}{\Gamma: \ p1, p1, p1, p1, p2, p1 \multimap p2 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} \ D_C
                                                                                                    \frac{\Gamma: p1, p1, p1, p1, p2 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3}{\Gamma: p1, p1, p1, p2 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} \rightarrow
\Gamma: p1 \vdash p1
                                   \frac{\Gamma \colon p1, p1, p1, p1, p1, p1, p1 \to p2 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3}{\Gamma \colon p1, p1, p1, p1, p1, p1 \to p2 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} \ D_C
                                                   \Gamma: p1, p1, p1, p1, p1 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3
                                                                            \Gamma: \ \Delta \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3
   file: MCC/HouseConstruction-010_1_1.p (1583 ms)
                                          \frac{\overline{\Gamma\colon p1\vdash p1}}{\Gamma\colon v1\ldotp v1\vdash p1\otimes p1}\underbrace{\frac{\Gamma\colon p1\vdash p1}{\Gamma\colon v1\ldotp v1\vdash p1\otimes p1}}_{\otimes}\otimes\underbrace{\frac{\overline{\Gamma\colon p1\vdash p1}}{\Gamma\colon p1\thickspace p1\otimes p1}}_{\otimes}\otimes
                                                                                                                                                                                                                                        \frac{\frac{\Gamma\colon p1\vdash p1}{\cap \neg 1} \otimes \frac{\Gamma\colon p1\vdash p1}{} \otimes \frac{\Gamma\colon p2\vdash p2}{} \otimes \frac{}{} \otimes \frac{}
                                                                         \Gamma: p1, p1, p1, p1 \vdash p1 \otimes p1 \otimes p1 \otimes p1
                                                                                                    \Gamma: p1 \vdash p1
```

file: MCC/HouseConstruction-010_5_1.p (4276 ms)

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\frac{\Gamma\colon p1\vdash p1}{\Gamma\colon p1\vdash p1\otimes p1} \otimes \frac{\Gamma\colon p1\vdash p1}{\Gamma\colon p1\vdash p1} \to \frac{\Gamma\colon p1\vdash p1}{\Gamma\colon p1\vdash p1
                                                                                                                                                                                                                                                           \Gamma: p2 \vdash p2
                                                                                                                         \Gamma: p1 \vdash p1
                                                                         file:
                                                      MCC/IBM319_10_1.p (3156 ms)
   file:
                                                      MCC/IBM319_1_1.p (878 ms)
     file:
                                                      MCC/IBM319_20_1.p (7355 ms)
     file:
                                                      MCC/IBM319_5_1.p (1841 ms)
     file:
                                                      MCC/IBM5964_1_1.p (73502 ms)
    file:
                                                     MCC/IBM703_10_1.p (2283 ms)
   file:
                                                      MCC/IBM703_1_1.p (483 ms)
\overline{\Gamma \colon alpha \vdash alpha} \quad \overline{\Gamma \colon process\_'s0000030\_'s00000703\_'input\_'s00000263} \vdash process\_'s00000030\_'s00000703\_'input\_'s00000263
          \Gamma: alpha, alpha - \circ process's 00000030\_'s 00000703\_'input's 00000263 \vdash process's 00000030\_'s 00000703\_'input's 00000263 \\ D_C
                                                                                                                                                                 \Gamma: \ alpha \vdash process\_'s00000030\_'s00000703\_'input\_'s00000263 \\ \star \\ \star
                                                                                                                                                                           \Gamma: \Delta \vdash process\_'s00000030\_\_'s00000703\_'input\_'s00000263
     file:
                                                      MCC/IBM703_20_1.p (8056 ms)
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MCC/IBM703_50_1.p (18122 ms)
       MCC/IBM703_5_1.p (1230 ms)
file:
file:
       MCC/LamportFastMutEx_lamport_fmea-2_10_1.p (10449 ms)
       MCC/LamportFastMutEx_lamport_fmea-2_1_1.p (1103 ms)
file:
       MCC/LamportFastMutEx_lamport_fmea-2_5_1.p (1940 ms)
       MCC/LamportFastMutEx_lamport_fmea-3_1_1.p (19866 ms)
file:
       {\tt MCC/LamportFastMutEx\_lamport\_fmea-3\_5\_1.p~(24078~ms)}
```

file: MCC/NeighborGrid_z_2d_3n_1m_c_1_2_1_1.p (21762 ms)

```
\frac{\Gamma\colon p.0.0+p.0.0}{\Gamma\colon p.0.0,p.0.1+p.0.0\otimes p.0.1}\otimes \frac{\Gamma\colon p.0.2+p.0.2}{\Gamma\colon p.0.2+p.0.0\otimes p.0.1\otimes p.0.2}\otimes \frac{\Gamma\colon p.1.0+p.1.0}{\Gamma\colon p.0.0,p.0.1,p.0.2+p.0.0\otimes p.0.1\otimes p.0.2}\otimes \frac{\Gamma\colon p.1.0+p.1.0}{\Gamma\colon p.0.0,p.0.1,p.0.2+p.0.0\otimes p.0.1\otimes p.0.2\otimes p.1.0}\otimes \frac{\Gamma\colon p.1.0+p.1.0}{\Gamma\colon p.0.0,p.0.1,p.0.2,p.1.0+p.0.0\otimes p.0.1\otimes p.0.2\otimes p.1.0}\otimes \frac{\Gamma\colon p.1.2+p.1.2}{\Gamma\colon p.0.0,p.0.1,p.0.2,p.1.0+p.0.2\otimes p.1.0\otimes p.0.1\otimes p.0.2\otimes p.1.0\otimes p.1.2\otimes p.2.0}\otimes \frac{\Gamma\colon p.2.0+p.2.0}{\Gamma\colon p.0.0,p.0.1,p.0.2,p.1.0,p.1.2,p.2.0+p.0.0\otimes p.0.1\otimes p.0.2\otimes p.1.0\otimes p.1.2\otimes p.2.0}\otimes \frac{\Gamma\colon p.2.1+p.2.1}{\Gamma\colon p.0.0,p.0.1,p.0.2,p.1.0\otimes p.1.2,p.2.0+p.0.0\otimes p.0.1\otimes p.0.2\otimes p.1.0\otimes p.1.2\otimes p.2.0}\otimes \frac{\Gamma\colon p.2.1+p.2.1}{\Gamma\colon p.2.1+p.2.1\otimes p.2.1\otimes 
                                                                                                                                                                                                                                                                                          \frac{1: p.u.u, p.u.t, p.
\Gamma: p_1_1 \vdash p_1_1
         file:
                                                                                                                                                                    MCC/NeighborGrid_z_2d_3n_1m_t_1_2_1_1.p (28427 ms)
                                                                                                                                                              \frac{ \frac{\mathsf{NCO}/\mathsf{NCool}}{\mathsf{F}: p.0.0 \vdash p.0.0} \vdash \frac{\mathsf{F}: p.0.1 \vdash p.0.1}{\mathsf{F}: p.0.0 \vdash p.0.0} \otimes \frac{\mathsf{F}: p.1.1 \vdash p.1.1}{\mathsf{F}: p.0.0 \vdash p.0.0} \otimes \frac{\mathsf{F}: p.0.1 \vdash p.0.0}{\mathsf{F}: p.0.0 \vdash p.0.0} \otimes \frac{\mathsf{F}: p.1.1 \vdash p.1.1}{\mathsf{F}: p.0.0 \vdash p.0.0 \vdash p.0.0} \otimes \frac{\mathsf{F}: p.0.1 \vdash p.0.0}{\mathsf{F}: p.0.0 \vdash p.0.1 \vdash p.0.0} \otimes \frac{\mathsf{F}: p.1.1 \vdash p.1.1}{\mathsf{F}: p.0.0 \vdash p.0.0 \vdash p.0.1 \vdash p.0.0} \otimes \frac{\mathsf{F}: p.0.0 \vdash p.0.0}{\mathsf{F}: p.0.0 \vdash p.0.0 \vdash p.0.0} \otimes \frac{\mathsf{F}: p.0.0 \vdash p.0.0}{\mathsf{F}: p.0.0 \vdash p.0.0 \vdash p.0.0} \otimes \frac{\mathsf{F}: p.0.0 \vdash p.0.0}{\mathsf{F}: p.0.0 \vdash p.0.0} \otimes \frac{\mathsf{F}: p.0.0}{\mathsf{F}: p.0.0} \otimes \frac{\mathsf{F}: p.0.0
\Gamma: p_1_0 \vdash p_1_0
            file:
                                                                                                                                                                    MCC/Peterson-2_1_1.p (14394 ms)
               file:
                                                                                                                                                                    MCC/Peterson-2_5_1.p (17659 ms)
                                                                                                                                                                    MCC/Philosophers-5_100_1.p (30876 ms)
            file:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     \frac{Cutch25}{5, Fork.1 + Catch2.5 \otimes Fork.1} \otimes \frac{\Gamma \colon Fork.2 \vdash Fork.2}{\Gamma \colon Fork.2 \vdash Fork.2} \otimes \frac{\Gamma \colon Fork.3 \vdash Fork.3}{\Gamma \colon Fork.3 \vdash Fork.3}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (2.Fork_2, Fork_3, Fork_4, Timek_1 \cap Cato(2.3 \otimes Fork_4) \otimes Fork_2 \otimes Fork_3 \otimes Fork_4 \otimes Finit_4) = Timek_2 \cap Finit_4 \otimes \cap Finit
               file:
                                                                                                                                                                        MCC/Philosophers-5_10_1.p (29996 ms)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       I hink.1, Think.2, Think.3, Think.4, Think.5 \vdash Catch2.5 \otimes Fork.1 \otimes Fork.2 \otimes Fork.3 \otimes Fork.4 \otimes \\ \Delta \vdash Catch2.5 \otimes Fork.1 \otimes Fork.2 \otimes Fork.3 \otimes Fork.4 \otimes Think.1 \otimes Think.2 \otimes Think.3 \otimes Think.4
            file: MCC/Philosophers-5_1_1.p (29759 ms)
```

```
MCC/Philosophers-5_20_1.p (7357 ms)
       MCC/Philosophers-5_50_1.p (7442 ms)
file:
       MCC/Philosophers-5_5_1.p (7699 ms)
       MCC/PhilosophersDyn_philo_dyn-3-unfolded_10_1.p (59985 ms)
file:
       {\tt MCC/PhilosophersDyn\_philo\_dyn-3-unfolded\_1\_1.p~(4381~ms)}
file:
       MCC/PhilosophersDyn_philo_dyn-3-unfolded_50_1.p (60658 ms)
file:
       MCC/PhilosophersDyn_philo_dyn-3-unfolded_5_1.p (23829 ms)
```

```
file: MCC/Raft_raft_02_100_1.p (1169 ms)

\underline{\Gamma: p20 \vdash p20} \quad \underline{\Gamma: p10 \vdash p10} \otimes \otimes

                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          \Gamma: p15, p20, p21, p27, p3, p9 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        \Gamma: \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
                                                                                                                                                                                                                        \Gamma: p10, p20 \vdash p20 \otimes p10
                                                                                                                                                                                                                                                                                        \frac{\Gamma: p15 \vdash p15}{\Gamma: p5 \vdash p5} \propto
                                                                                                                                                                                                                                                                                                                                      \Gamma: p10, p15, p20, p21, p27, p3 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9 
                                                                                                                                                                                                                                                                                                                                                                                       \Gamma: \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
                                                                          \Gamma: p15, p5 \vdash p15 \otimes p5
                                                                                                                              \underline{\Gamma}:\ p10,p15,p20,p21,p27,p5 \vdash p15\otimes p20\otimes p21\otimes p27\otimes p3\otimes p9
                                                                                                                                                                                                                                \Gamma: \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
                      \frac{\Gamma:\ p0,p0\multimap p21\otimes p27\otimes p20\otimes p15\otimes p10\otimes p5\vdash p15\otimes p20\otimes p21\otimes p27\otimes p3\otimes p9}{\Gamma:\ p0\vdash p15\otimes p20\otimes p21\otimes p27\otimes p3\otimes p9}\ D_{C}
                                                                                                             \frac{\cdot \quad p \cdot 10 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma : \quad \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \ \star
      file:
                                                                  MCC/Raft_raft_02_10_1.p (1148 ms)
                                                                                                                                                                                                                                                                                                                                                                     \frac{\overline{\Gamma \colon p15 \vdash p15} \quad \overline{\Gamma \colon p20 \vdash p20}}{\Gamma \colon n15, p20 \vdash p15 \otimes p20} \otimes \frac{\overline{\Gamma \colon p21 \vdash p21}}{\Gamma \colon n15 \otimes p20} \otimes \frac{\overline{\Gamma \colon p21 \vdash p21}}{\overline{\Gamma \colon p27 \vdash p27}} \otimes \frac{\overline{\Gamma \colon p3 \vdash p3}}{\overline{\Gamma \colon p3 \vdash p3}} \otimes \frac{\overline{\Gamma \colon p3 \vdash p3}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 
                                                                                                                                                                                                                                                                                                                                                                                                                                     \frac{\Gamma : p15, p20, p21, p27 + p15 \otimes p20 \otimes p21}{\Gamma : p15, p20, p21, p27, p3 + p15 \otimes p20 \otimes p21 \otimes p27} \otimes \frac{\Gamma : p3 + p3}{\Gamma : p15, p20, p21, p27, p3 + p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3} \otimes \frac{\Gamma : p3}{\Gamma : p15, p20, p21, p27, p3, p9 + p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \times \frac{\Gamma : p15, p20, p21, p27, p3, p9 + p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma : p15, p20, p21, p27, p3, p9 + p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \times \frac{\Gamma : p3}{\Gamma : p15, p20, p21, p27, p3, p3} \times \frac{\Gamma : p3}{\Gamma : 

\underline{\Gamma: p20 \vdash p20} \quad \underline{\Gamma: p10 \vdash p10} \otimes \\

                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         \Gamma: \Delta \vdash \underline{p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \longrightarrow
                                                                                                                                                                                                                               : p10, p20 \vdash p20 \otimes p10
                                                                                                                                                                                                                                                                                   \frac{p-6}{\Gamma}: p10, p15, p20, p21, p27, p3, p20 \otimes p10 \rightarrow p9 \otimes p20 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma} D_{C}
                                                            \overline{\Gamma: p15 \vdash p15} \quad \overline{\Gamma: p5 \vdash p5} \otimes
                                                                                                                                                                                                                                                                                                                                      \frac{\Gamma:\ p10, p15, p20, p21, p27, p3 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{}
                                                                                                                                                                                                                                                                                                                                                                                       \Gamma: \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
                                                                          \Gamma: p15, p5 \vdash p15 \otimes p5
                                                                                                                              \frac{\Gamma : p10, p15, p20, p21, p27, p5, p15 \otimes p5 - p3 \otimes p15 + p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma : p10, p15, p20, p21, p27, p5 + p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \xrightarrow{\star} D_{C}
                       \Gamma: p0 \vdash p0
                                                                                                                \Gamma: p0 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9 \star
                                                                                                                \overline{\Gamma:\ \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3} \otimes p9
      file:
                                                                   MCC/Raft_raft_02_1_1.p (641 ms)
                                                                                            \Gamma: p10 \vdash p10 \quad \Gamma: p15 \vdash p15
                                                                                                              \Gamma: p10, p15 \vdash p10 \otimes p15
                                                                                                                                                                                                                                                                                                                                        \Gamma: p20 \vdash p20
                                                                                                                                                                                                                                                                                                                                                                                                                                  \frac{\sigma}{\Gamma} \otimes \frac{\Gamma}{\Gamma} : p2\underline{1 \vdash p21}
                                                                                                                                                    \Gamma: p10, p15, p20 \vdash p10 \otimes p15 \otimes p20
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         \Gamma: p27 \vdash p27
                                                                                                                                                                                                   \Gamma: p10, p15, p20, p21 \vdash p10 \otimes p15 \otimes p20 \otimes p21
                                                                                                                                                                                                                                                     \Gamma: p10, p15, p20, p21, p27 \vdash p10 \otimes p15 \otimes p20 \otimes p21 \otimes p27
                                                                                                                                                                                                                                                                                                          \Gamma: p10, p15, p20, p21, p27, p5 \vdash p10 \otimes p15 \otimes p20 \otimes p21 \otimes p27 \otimes p5
                                                                                                                                                                                                                                                                                                                                                                                       \Gamma: \Delta \vdash p10 \otimes p15 \otimes p20 \otimes p21 \otimes p27 \otimes p5 
\Gamma: p0 \vdash p0
                                                \frac{1}{\Gamma}: \ p0, p0 \multimap p21 \otimes p27 \otimes p20 \otimes p15 \otimes p10 \otimes p5 \vdash p10 \otimes p15 \otimes p20 \otimes p21 \otimes p27 \otimes p5}{D_C}
                                                                                                                                                                                          \overline{\Gamma: p0 \vdash p10 \otimes p15 \otimes p20 \otimes p21} \otimes p27 \otimes p5
                                                                                                                                                                                          \Gamma:\ \Delta \vdash p10 \otimes p15 \otimes p20 \otimes p21 \otimes p27 \otimes p5
      file: MCC/Raft_raft_02_20_1.p (1155 ms)
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```
\frac{\overline{\Gamma\colon p15\vdash p15} \quad \overline{\Gamma\colon p20\vdash p20}}{\frac{\Gamma\colon p15, p20\vdash p15\otimes p20}{\Gamma\colon p15, p20\vdash p15\otimes p20}} \otimes \frac{\overline{\Gamma\colon p21\vdash p21}}{\Gamma\colon p15, p20\vdash p15\otimes p20\otimes p21} \otimes \frac{\overline{\Gamma\colon p27\vdash p27}}{\Gamma\colon p27\vdash p27} \otimes \frac{\overline{\Gamma\colon p3\vdash p3}}{\Gamma\colon p3\vdash p3} \otimes \frac{\overline{\Gamma\colon p9\vdash p9}}{\Gamma\colon p9\vdash p9} \otimes \frac{\overline{\Gamma\colon p9\vdash p9}}{\mathbb{F}\colon p9\vdash p9} \otimes \mathbb{F}\colon p9\vdash p9} \otimes \mathbb{F}\colon p9\vdash p9\vdash p9}
                                                                                                                                                                                                                                                          \frac{\overline{\Gamma:\ p20\vdash p20}\quad \overline{\Gamma:\ p10\vdash p10}}{\overline{\Gamma:\ p10\vdash p10}}\otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         \frac{\Gamma:\ p15, p20, p21, p27, p3, p9 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\star}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   \Gamma: \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9 \multimap
                                                                                                                                                                                                                                                                          \Gamma: p10, p20 \vdash p20 \otimes p10
                                                                                                                                                                                                                                                                                                                                                    \frac{ -p20 \otimes p10 }{\Gamma \colon p10, p15, p20, p21, p27, p3, p20 \otimes p10 \multimap p9 \otimes p20 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma \colon p10, p15, p20, p21, p27, p3 + p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} D_C
                                                                         \overline{\Gamma:\ p15 \vdash \underline{p15}} \quad \overline{\Gamma:\ p5 \vdash p5} \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            \Gamma: \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
                                                                                         \Gamma: p15, p5 \vdash p15 \otimes p5
                                                                                                                                                           \frac{\Gamma : p10, p15, p20, p21, p27, p5, p15 \otimes p5 - p3 \otimes p15 + p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma : p10, p15, p20, p21, p27, p5 + p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \underset{\bigstar}{D_C}
                                                                                                                                                                                                                                                                                \Gamma: \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
\Gamma: p0 \vdash p0
                            \frac{\Gamma: p0, \underline{p0} - p21 \otimes p27 \otimes p20 \otimes p15 \otimes p10 \otimes p5 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{D_{C}}
                                                                                                                                           \Gamma: p0 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
                                                                                                                                          \frac{\Gamma: \ \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma: \ \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \ \star
        file:
                                                                                MCC/Raft_raft_02_50_1.p (1144 ms)
                                                                                                                                                                                                                                                                                                                                                                                                                                                       \frac{\Gamma \colon p15 \vdash p15}{\Gamma \colon p15 \vdash p15} \frac{\Gamma \colon p20 \vdash p20}{\Gamma \colon p15 \otimes p20} \otimes \frac{\Gamma \colon p21 \vdash p21}{\Gamma \colon p15 \otimes p20} \otimes \frac{\Gamma \colon p21 \vdash p21}{\Gamma \colon p27 \vdash p27} \otimes \frac{\Gamma \colon p3 \vdash p3}{\Gamma \colon p3 \vdash p3} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma 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\frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon p9 \vdash p9} \otimes \frac{\Gamma \colon p9 \vdash p9}{\Gamma \colon 
                                                                                                                                                                                                                                                            \overline{\Gamma: p20 \vdash p20} \quad \overline{\Gamma: p10 \vdash p10} \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         \frac{\Gamma:\ p15, p20, p21, p27, p3, p9 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\star}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                \frac{\Gamma}{\Gamma} : \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \rightarrow
                                                                                                                                                                                                                                                                          \Gamma: p10, p20 \vdash p20 \otimes p10
                                                                                                                                                                                                                                                                                                                                                     \frac{\Gamma: p10, p15, p20, p21, p27, p3, p20 \otimes p10 \multimap p9 \otimes p20 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma: p10, p15, p20, p21, p27, p3, p20 \otimes p10 \multimap p9 \otimes p20 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} D_C
                                                                         \overline{\Gamma: p15 \vdash p15} \quad \overline{\Gamma: p5 \vdash p5} \otimes
                                                                                                                                                                                                                                                                                                                                                                                                               \Gamma: p10, p15, p20, p21, p27, p3 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9 \xrightarrow{\star}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            \frac{\Gamma: \ \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{} \ \multimap
                                                                                           \Gamma: p15, p5 \vdash p15 \otimes p5
                                                                                                                                                           \frac{-p_{15}\otimes p_{5}}{\Gamma:\ p_{10},p_{15},p_{20},p_{21},p_{27},p_{5},p_{15}\otimes p_{5}\multimap p_{3}\otimes p_{15}\vdash p_{15}\otimes p_{20}\otimes p_{21}\otimes p_{27}\otimes p_{3}\otimes p_{9}}{\Gamma:\ p_{10},p_{15},p_{20},p_{21}\otimes p_{27}\otimes p_{3}\otimes p_{9}}
                                                                                                                                                                                                                     \Gamma: p10, p15, p20, p21, p27, p5 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
                                                                                                                                                                                                                                                                                  \Gamma: \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
 \Gamma: p0 \vdash p0
                            \Gamma: p0, p0 \multimap p21 \underline{\otimes p27 \otimes p20 \otimes p15 \otimes p10 \otimes p5} \vdash p15 \underline{\otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} D_{C}
                                                                                                                                          \Gamma: p0 \vdash \underline{p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \star
                                                                                                                                          \Gamma: \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
                                                                                   MCC/Raft_raft_02_5_1.p (1160 ms)
                                                                                                                                                                                                                                                                                                                                                                                                                                                       \frac{\overline{\Gamma \colon p15 \vdash p15} \quad \overline{\Gamma \colon p20 \vdash p20}}{\Gamma \colon p15, p20 \vdash p15 \otimes p20} \otimes \frac{\overline{\Gamma \colon p21 \vdash p21}}{\Gamma \colon p15 \otimes p20} \otimes \frac{\overline{\Gamma \colon p21 \vdash p21}}{\overline{\Gamma \colon p27 \vdash p27}} \otimes \frac{\overline{\Gamma \colon p3 \vdash p3}}{\overline{\Gamma \colon p3 \vdash p3}} \otimes \frac{\overline{\Gamma \colon p3 \vdash p3}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma 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p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma \colon p9 \vdash p9}} \otimes \frac{\overline{\Gamma \colon p9 \vdash p9}}{\overline{\Gamma 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                                                                                                                                                                                                                                                        \frac{\Gamma: p20 \vdash p20}{\Gamma: p10 \vdash p10} \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         \frac{\Gamma:\ p15, p20, p21, p27, p3, p9 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\star}
                                                                                                                                                                                                                                                                        \Gamma: p10, p20 \vdash p20 \otimes p10
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                \Gamma: \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
                                                                                                                                                                                                                                                                                                                                                    \frac{p20 \otimes p30}{\Gamma : p10, p15, p20, p21, p27, p3, p20 \otimes p10 \multimap p9 \otimes p20 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{DC}
                                                                                                                                                                                                                                                                                                                                                                                                              \frac{\Gamma \colon p10, p15, p20, p21, p7, p3 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma \colon \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \star

\underline{\Gamma: p15 \vdash p15} \quad \underline{\Gamma: p5 \vdash p5} \otimes

                                                                                             \Gamma: p15, p5 \vdash p15 \otimes p5
                                                                                                                                                           \frac{\Gamma: \ p10, p15, p20, p21, p27, p5, p15 \otimes p5 \multimap p3 \otimes p15 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{DC} \xrightarrow{DC}
                                                                                                                                                                                                                     \frac{\Gamma:\ p10, p15, p20, p21, p27, p5 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{}
                                                                                                                                                                                                                                                                                \frac{\Gamma: \ \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{} \ \multimap
\Gamma: p0 \vdash p0
                            \frac{\Gamma: \ p0, p0 \multimap p21 \otimes p27 \otimes p20 \otimes p15 \otimes p10 \otimes p5 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{D_C}
                                                                                                                                           \Gamma: p0 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
                                                                                                                                          \Gamma: \ \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9
      file: MCC/ResAllocation_RAS-C-3_100_1.p (1804 ms)
 \frac{\Gamma : r_1 1_0 \vdash r_1 1_0}{\Gamma : r_1 1_0 r_2 1_0 \vdash r_1 1_0 \otimes r_2 1_0}
                                                                                 MCC/ResAllocation_RAS-C-3_10_1.p (1661 ms)
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200

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file:
                MCC/ResAllocation_RAS-C-3_1_1.p (5894 ms)
                                      Γ: p-2-0 ⊢ p-2-0 Γ: r-0-0 ⊢ r-0-0 ⊗
                                       \frac{\Gamma: \ r.0.0, r.0.1, r.0.2, r.1.0, r.1.1, r.1.2, r.2.0, r.2.1, r.2.2 \vdash p.2.0 \otimes r.0.0 \otimes r.0.1 \otimes r.0.2 \otimes r.1.1 \otimes r.1.2 \otimes r.2.1 \otimes r.2.2}{\Gamma: \ \Delta \vdash p.2.0 \otimes r.0.0 \otimes r.0.1 \otimes r.0.2 \otimes r.1.1 \otimes r.1.2 \otimes r.2.1 \otimes r.2.2} \star \frac{}{}
                MCC/ResAllocation_RAS-C-3_20_1.p (1758 ms)
 file: MCC/ResAllocation_RAS-C-3_50_1.p (1653 ms)
 file:
                MCC/ResAllocation_RAS-C-3_5_1.p (2088 ms)
                MCC/ResAllocation_RAS-R-2_100_1.p (92 ms)
                                                                              \Gamma: p_{-1} \perp 1 \vdash p_{-1} \perp 1 \qquad \Gamma: r_{-0} \perp 0 \vdash r_{-0} \perp 0
                                                                                  \Gamma: p_{-1}_{-1}, r_{-0}_{-0} \vdash p_{-1}_{-1} \otimes r_{-0}_{-0}
\overline{\Gamma: r\_0\_1 \vdash r\_0\_1} \quad \overline{\Gamma: r\_1\_1 \vdash r\_1\_1} \otimes
                                                                                                                                                            \Gamma: r_1_0 \vdash r_1_0
                                                                                            \Gamma: p_{-1}, r_{-0}, r_{-1} \vdash p_{-1}, r_{-0} \otimes r_{-1}
     \Gamma: r_0_1, r_1_1 \vdash r_0_1 \otimes r_1_1
                      \frac{r}{\Gamma}: \ r\_0\_0, r\_0\_1, r\_1\_0, r\_1\_1, r\_0\_1 \otimes r\_1\_1 \underline{\hspace{1cm} -\circ p\_1\_1 \vdash p\_1\_1 \otimes r\_0\_0 \otimes r\_1\_0}
                                            \Gamma: r_0_0, r_0_1, r_1_0, r_1_1 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0
                                                                \Gamma: \Delta \vdash p_1 = 1 \otimes r_0 = 0 \otimes r_1 = 0
```

file: MCC/ResAllocation_RAS-R-2_10_1.p (88 ms)

```
\frac{\Gamma: \ p\_1\_1 \vdash p\_1\_1}{\Gamma: \ p\_1\_1, r\_0\_0 \vdash p\_1\_1 \otimes r\_0\_0}
\overline{\Gamma: r_-0_-1} \vdash r_-0_-1 \overline{\Gamma: r_-1_-1 \vdash r_-1_-1} \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                           \Gamma: p_{-1}_{-1}, r_{-0}_{-0}, r_{-1}_{-0} \vdash p_{-1}_{-1} \otimes r_{-0}_{-0} \otimes r_{-1}_{-0}
                          \Gamma: r_0_1, r_1_1 \vdash r_0_1 \otimes r_1_1
                                                                                                                 \Gamma: r_0 = 0, r_0 = 1, r_1 = 0, r_1 = 1, r_0 = 1, r_1 = 0, r_1 = 1, r_1 = 0, r_1 = 1, r_1 = 1, r_1 = 1, r_2 = 1, r_3 = 1, r_4 = 1, r_5 = 1
                                                                                                                                                                                                                              \Gamma: r_0_0, r_0_1, r_1_0, r_1_1 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0
                                                                                                                                                                                                                                                                                                                                   \Gamma: \Delta \vdash p_1 = 1 \otimes r_1 \otimes r_2 \otimes r_1 \otimes r_2 \otimes r_2 \otimes r_3 \otimes r_4 \otimes
         file: MCC/ResAllocation_RAS-R-2_1_1.p (79 ms)
                                                                                                                                                                                                                                                                                                                                                                                                             \Gamma: p_{-1} \perp 1 \vdash p_{-1} \perp 1 \qquad \overline{\Gamma: r_{-0} \perp 0 \vdash r_{-0} \perp 0}
                                                                                                                                                                                                                                                                                                                                                                                                                                 \Gamma: p_-1_-1, r_-0_-0 \vdash p_-1_-1 \otimes r_-0_-0
\overline{\underline{\Gamma}:\ r\_0\_1 \vdash r\_0\_1} \quad \overline{\underline{\Gamma}:\ r\_1\_1 \vdash r\_1\_1} \ \otimes
                          \Gamma: r_0_1, r_1_1 \vdash r_0_1 \otimes r_1_1
                                                                                                                                                                                                                                                                                                                                                                                                                                         \Gamma: p_{-1}, r_{-0}, r_{-1} \mapsto p_{-1} \otimes r_{-0} \otimes r_{-1}
                                                                                                                 \Gamma: r_0_0, r_0_1, r_1_0, r_1_1, r_0_1 \otimes r_1_1 \rightarrow p_1_1 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0
                                                                                                                                                                                                                              \Gamma: r_0_0, r_0_1, r_1_0, r_1_1 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0
                                                                                                                                                                                                                                                                                                                                    \Gamma: \Delta \vdash p\_1\_1 \otimes r\_0\_0 \otimes r\_1\_0
         file: MCC/ResAllocation_RAS-R-2_20_1.p (132 ms)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              \frac{\overline{\Gamma}: \ p.1.0 \vdash p.1.0}{\Gamma: \ p.1.0, r.0.1 \vdash p.1.0 \otimes r.0.1} \otimes \overline{\Gamma}: \ r.1.1 \vdash r.1.1}{\Gamma: \ p.1.0, r.0.1 \vdash p.1.0 \otimes r.0.1} \otimes \overline{\Gamma}: \ r.1.1 \vdash r.1.1} \otimes
                                                                                                                                                                                                                                                      \frac{\overline{\Gamma\colon r.0.0 \vdash r.0.0} \quad \overline{\Gamma\colon r.1.0 \vdash r.1.0}}{\Gamma\colon r.0.0, r.1.0 \vdash r.0.0 \otimes r.1.0} \otimes \frac{\overline{\Gamma\colon p.1.1 \vdash p.1.1}}{\overline{\Gamma\colon p.1.1 \vdash p.1.1}} \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           \Gamma: p_{-1} = 0, r_{-0} = 1, r_{-1} = 1 + p_{-1} = 0 \otimes r_{-0} = 1 \otimes r_{-1} = 1
                                                                                                                                                                                                                                                                                                     \Gamma: p_1_1, r_0_0, r_1_0 \vdash r_0_0 \otimes r_1_0 \otimes p_1_1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            \Gamma: \Delta \vdash \underline{p\_1\_0} \otimes r\_0\_1 \otimes r\_1\_1 \xrightarrow{} - \circ
                                                                                                                                                                                                                                                                                                             \underline{\Gamma: \ p.1.1, r.0.0, r.1.0, r.0.0 \otimes r.1.0 \otimes p.1.1 \multimap r.0.1 \otimes p.1.0 \otimes r.1.1 \vdash p.1.0 \otimes r.0.1 \otimes r.1.1} \ D_C
  \underline{\Gamma: \ r\_0\_1 \vdash r\_0\_1} \quad \underline{\Gamma: \ r\_1\_1 \vdash r\_1\_1} \ \otimes 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    \Gamma: p_1.1, r_0.0, r_1.0 \vdash p_1.0 \otimes r_0.1 \otimes r_{1.1}
                    \Gamma : \overline{r_{-0}_{-1}, r_{-1}_{-1}} \vdash r_{-0}_{-1} \otimes r_{-1}_{-1}
                                                                                                                                                          \Gamma: r_{-0.0}, r_{-0.1}, r_{-1.0}, r_{-1.1}, r_{-0.1} \otimes r_{-1.1} \to p_{-1.1} \vdash p_{-1.0} \otimes r_{-0.1} \otimes r_{-1.1}}{D_C}
                                                                                                                                                                                                                           \Gamma: \ r\_0\_0, r\_0\_1, r\_1\_0, r\_1\_1 \vdash p\_1\_0 \otimes r\_0\_1 \otimes r\_1\_1
                                                                                                                                                                                                                                                                                   \Gamma: \Delta \vdash p\_1\_0 \otimes r\_0\_1 \otimes r\_1\_1
       file: MCC/ResAllocation_RAS-R-2_50_1.p (125 ms)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             \frac{\overline{\Gamma\colon p.1.0\vdash p.1.0} \quad \overline{\Gamma\colon r.0.1\vdash r.0.1}}{\underline{\Gamma\colon p.1.0, r.0.1\vdash p.1.0\otimes r.0.1}} \otimes \frac{\overline{\Gamma\colon r.1.1\vdash r.1.1}}{\underline{\Gamma\colon r.1.1\vdash r.1.1}} \otimes
                                                                                                                                                                                                                                                      \frac{\overline{\Gamma\colon r.0.0 \vdash r.0.0}}{\Gamma\colon r.0.0, r.1.0 \vdash r.0.0 \otimes r.1.0} \otimes \frac{\overline{\Gamma\colon r.1.0 \vdash r.1.0}}{\Gamma\colon p.1.1 \vdash p.1.1} \otimes \overline{\Gamma\colon p.1.1 \vdash p.1.1} \\ \times \Gamma\colon p.1.1, r.0.0, r.1.0 \vdash r.0.0 \otimes r.1.0 \otimes p.1.1 \\ \otimes \Gamma\colon p.1.1 \mapsto p.1.1 \otimes p
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 \Gamma: p_{-1}_{-0}, r_{-0}_{-1}, r_{-1}_{-1} \vdash p_{-1}_{-0} \otimes r_{-0}_{-1} \otimes r_{-1}_{-1} \\ \star
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       \Gamma: \Delta \vdash p\_1\_0 \otimes r\_0\_1 \otimes r\_1\_1
                                                                                                                                                                                                                                                                                                                                 \Gamma: \ p\_1\_1, r\_0\_0, r\_1\_0, r\_0\_0 \otimes r\_1\_0 \otimes p\_1\_1 \multimap r\_0\_1 \otimes p\_1\_0 \otimes r\_1\_1 \vdash p\_1\_0 \otimes r\_0\_1 \otimes r\_1\_1 \\ D_C
   \Gamma: r\_0\_1 \vdash r\_0\_1 \qquad \overline{\Gamma: r\_1\_1 \vdash r\_1\_1} \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          \Gamma: p_1_1, r_0_0, r_1_0 \vdash p_1_0 \otimes r_0_1 \otimes r_1_1
                            : r_0_1, r_1_1 \vdash r_0_1 \otimes r_1_1
                                                                                                                                                          \frac{\circ}{\Gamma} : r_{-}0_{-}0_{-}, r_{-}0_{-}1, r_{-}1_{-}0_{-}, r_{-}1_{-}1, r_{-}0_{-}1 \otimes r_{-}1_{-}1} \rightarrow p_{-}1_{-}1 \vdash p_{-}1_{-}0 \otimes r_{-}0_{-}1 \otimes r_{-}1_{-}1} \xrightarrow{D_{C}}
                                                                                                                                                                                                                            \Gamma: r_0_0, r_0_1, r_1_0, r_1_1 \vdash p_1_0 \otimes r_0_1 \otimes r_1_1
                                                                                                                                                                                                                                                                                   \Gamma: \Delta \vdash p\_1\_0 \otimes r\_0\_1 \otimes r\_1\_1
         file:
                                                                                  MCC/ResAllocation_RAS-R-2_5_1.p (125 ms)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              \frac{\overline{\Gamma} \colon p.1.0 \vdash p.1.0}{\underline{\Gamma} \colon p.1.0, r.0.1 \vdash p.1.0 \otimes r.0.1} \otimes \frac{\overline{\Gamma} \colon r.1.1 \vdash r.1.1}{\underline{\Gamma} \colon p.1.0, r.0.1} \otimes \frac{\overline{\Gamma} \colon r.1.1 \vdash r.1.1}{\underline{\Gamma} \colon p.1.0, r.0.1} \otimes \frac{\overline{\Gamma} \colon r.1.1 \vdash r.1.1}{\underline{\Gamma} \colon p.1.0} \otimes \frac{\overline{\Gamma} \colon r.1.1}{\underline{\Gamma} \colon p.1.0} \otimes \frac{\overline{\Gamma} \colon p.1.0}{\underline{\Gamma} \colon p.1.0} \otimes
                                                                                                                                                                                                                                                    \frac{\overline{\Gamma\colon r.0.0 \vdash r.0.0}}{\frac{\Gamma\colon r.0.0, r.1.0 \vdash r.0.0 \otimes r.1.0}{\Gamma\colon p.1.1, r.0.0, r.1.0 \vdash r.0.0 \otimes r.1.0}} \otimes \frac{\overline{\Gamma\colon p.1.1 \vdash p.1.1}}{\overline{\Gamma\colon p.1.1, r.0.0, r.1.0 \vdash r.0.0 \otimes r.1.0 \otimes p.1.1}} \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                \frac{\Gamma: \ p.1.0, r.0.1, r.1.1 \vdash p.1.0 \otimes r.0.1 \otimes r.1.1}{\star} \ \star
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               \Gamma: \Delta \vdash p\_1\_0 \otimes r\_0\_1 \otimes r\_1\_1 \longrightarrow
                                                                                                                                                                                                                                                                                                                            \frac{\Gamma: \ p.1.1, r.0.0, r.1.0, r.0.0 \otimes r.1.1 \otimes p.1.1 - o.r.0.1 \otimes p.1.0 \otimes r.1.1 \vdash p.1.0 \otimes r.0.1 \otimes r.1.1}{D_{C}}
   \overline{\Gamma: r\_0\_1 \vdash r\_0\_1} \quad \overline{\Gamma: r\_1\_1 \vdash r\_1\_1} \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          \Gamma: p_{-1}, r_{-0}, r_{-1}, r_{-0} \mapsto p_{-1}, r_{-0}, r_{-1}, r_{-1}
                  \Gamma: r_{-0}_{-1}, r_{-1}_{-1} \vdash r_{-0}_{-1} \otimes r_{-1}_{-1}
                                                                                                                                                      \begin{array}{c} 1 \otimes r.1.1 \\ \hline \Gamma : \frac{r.0.0, r.0.1, r.1.0, r.1.1, r.0.1 \otimes r.1.1 - o.p.1.1 + p.1.0 \otimes r.0.1 \otimes r.1.1}{c.o.1 \otimes r.1.1} \ D_C \\ \end{array} 
                                                                                                                                                                                                                            \Gamma: r_0_0, r_0_1, r_1_0, r_1_1 \vdash p_1_0 \otimes r_0_1 \otimes r_1_1
                                                                                                                                                                                                                                                                                          \Gamma: \Delta \vdash p_1_0 \otimes r_0_1 \otimes r_1_1
                                                                                   MCC/ResAllocation_RAS-R-3_100_1.p (227 ms)
```

```
file: MCC/ResAllocation_RAS-R-3_10_1.p (230 ms)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          \frac{\overline{\Gamma \colon p.1.1 \vdash p.1.1}}{ \overline{\Gamma \colon r.0.0 \vdash p.1.1 \otimes r.0.0}} \xrightarrow{\overline{\Gamma \colon r.0.2 \vdash r.0.2}} \otimes \xrightarrow{\overline{\Gamma \colon r.0.2 \vdash r.0.2}} \otimes \xrightarrow{\overline{\Gamma \colon r.1.0 \vdash r.1.0}} \otimes \xrightarrow{\overline{\Gamma \colon r.1.0 \vdash r.1.0}} \otimes \xrightarrow{\overline{\Gamma \colon r.1.2 \vdash r.1.2}} \otimes \xrightarrow{\overline{\Gamma \colon r.1.
                                                                                                                                                                                 \frac{\frac{\Gamma\colon p.1.1+r.0.1}{\Gamma\colon r.0.1+r.0.1} \frac{\Gamma\colon p.1.2+r.1.1}{\Gamma\colon p.1.1+r.0.1 \otimes r.1.1} \otimes \frac{\frac{\Gamma\colon p.1.1+r.0.0}{\Gamma\colon p.1.2+p.1.2}}{\frac{\Gamma\colon p.1.1,r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2}{\Gamma\colon p.1.1,r.0.0,r.0.2,r.1.0} \otimes \frac{\Gamma\colon r.1.0+r.1.0}{\Gamma\colon p.1.1+r.0.0 \otimes r.0.2 \otimes r.1.0} \otimes \frac{\Gamma\colon r.1.0+r.1.0}{\Gamma\colon p.1.1+r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0} \otimes \frac{\Gamma\colon r.1.2+r.0}{\Gamma\colon p.1.1,r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0} \otimes \frac{\Gamma\colon r.1.2+r.0}{\Gamma\colon p.1.1,r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0} \times \frac{2\vdash r.1.2}{\Gamma\colon p.1.2+r.0.0,r.0.1,r.1.1+r.0.1 \otimes r.1.1 \otimes p.1.2} \times \frac{P\colon p.1.1,r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0 \otimes r.0.2}{\Gamma\colon p.1.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0 \otimes r.1.2} \otimes \frac{P\colon p.1.1,r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0 \otimes r.0.2}{\Gamma\colon r.0.0,r.0.1,r.0.2+p.1.1,r.0.1,r.0.1 \otimes r.1.1 \otimes p.1.2} \otimes \frac{P\colon p.1.1,r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0 \otimes r.0.2}{\Gamma\colon r.0.0,r.0.1,r.0.2+p.1.1,r.1.1+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0 \otimes r.1.2} \otimes \frac{P\colon r.1.0+r.1.0}{\Gamma\colon p.1.1+r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0 \otimes r.1.2} \otimes \frac{P\colon r.1.0+r.1.1}{\Gamma\colon p.1.1+r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0 \otimes r.1.2} \otimes \frac{P\colon r.1.0+r.1.1}{\Gamma\colon p.1.1+r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0 \otimes r.1.2} \otimes \frac{P\colon r.1.0+r.1.1}{\Gamma\colon p.1.1+r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0 \otimes r.1.2} \otimes \frac{P\colon r.1.1+r.0.0}{\Gamma\colon p.1.1+r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0 \otimes r.1.2} \otimes \frac{P\colon r.1.1+r.0.0}{\Gamma\colon p.1.1+r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0 \otimes r.1.2} \otimes \frac{P\colon r.1.1+r.0.0}{\Gamma\colon p.1.1+r.0.0,r.0.2+p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0 \otimes r.1.2} \otimes \frac{P\colon r.1.1+r.0.0}{\Gamma\colon p.1.1+r.0.0} \otimes \frac{P\colon r.1.1+r.0.0}{\Gamma
                                                                                                                                                                                                                                                                                                                                                                \Gamma : \Delta \vdash p\_1\_1 \otimes r\_0\_0 \otimes r\_0\_2 \otimes r\_1\_0 \otimes r\_1\_2
                                                                                                               MCC/ResAllocation_RAS-R-3_1_1.p (168 ms)
                                                                                                                                                                                                                                                                                                                                                                                               \overline{\Gamma: \ p\_1\_2 \vdash p\_1\_2} \quad \overline{\Gamma: \ r\_0\_0 \vdash r\_0\_0}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          \overline{\Gamma}:\ r\_0\_1 \vdash r\_0\_1
                                                                                                                                                                                                                                                                                                                                                                                                                            \Gamma: p_1_2, r_0_0 \vdash p_1_2 \otimes r_0_0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             \frac{1}{\Gamma} \otimes \overline{\Gamma: r_1 \cup \Gamma \cap \Gamma_1 \cup \Gamma}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          \Gamma: p_1_2, r_0_0, r_0_1 \vdash p_1_2 \otimes r_0_0 \otimes r_0_1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       \frac{1.2, r\_0.0, r\_0.1 \vdash p\_1.2 \otimes r\_0.0 \otimes r\_0.1}{\Gamma : p\_1.2, r\_0.0, r\_0.1, r\_1.0 \vdash p\_1.2 \otimes r\_0.0 \otimes r\_0.1 \otimes r\_1.0} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1 \vdash r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1} \otimes \frac{\Gamma : r\_1.1}{\Gamma : r\_1.1} \otimes \frac{\Gamma : r\_1.1 \vdash r\_1.1}{\Gamma : r\_1.1} \otimes \frac{\Gamma : r\_1.1} \otimes \frac{\Gamma : r\_1.1}{\Gamma : r\_1.1} \otimes \frac{\Gamma : r\_1.1}{\Gamma : r\_1.1} \otimes 
  \Gamma: r_0 + r
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  \frac{\Gamma}{\Gamma}: \ p.1.2, r.0.0, r.0.1, r.1.0, r.1.1 \vdash p.1.2 \otimes r.0.0 \otimes r.0.1 \otimes r.1.0 \otimes r.1.1}{\rho}
                            \Gamma: r_0_2, r_1_2 \vdash r_0_2 \otimes r_1_2
                                                                                                                                                                                \begin{array}{c} r.0.2 \otimes r.1.2 \\ \hline \Gamma: & r.0.0, r.0.1, r.0.2, r.1.0, r.1.1, r.1.2, r.0.2 \otimes r.1.2 \multimap p.1.2 \vdash p.1.2 \otimes r.0.0 \otimes r.0.1 \otimes r.1.0 \otimes r.1.1 \\ \hline D_C \\ \end{array} 
                                                                                                                                                                                                                                                                                          \Gamma: \ r\_0\_0, r\_0\_1, r\_0\_2, r\_1\_0, r\_1\_1, r\_1\_2 \vdash p\_1\_2 \otimes r\_0\_0 \otimes r\_0\_1 \otimes r\_1\_0 \otimes r\_1\_1
                                                                                                                                                                                                                                                                                                                                                                                                                                                    \Gamma: \Delta \vdash p_{-1} = 2 \otimes r_{-0} = 0 \otimes r_{-0} = 1 \otimes r_{-1} = 0 \otimes r_{-1} = 1
                                                                                                               MCC/ResAllocation_RAS-R-3_20_1.p (227 ms)
          file:
                                                                                                             MCC/ResAllocation_RAS-R-3_50_1.p (219 ms)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               \frac{\Gamma\colon p.1.1\vdash p.1.1}{\Gamma\colon p.1.1, r.0.0\vdash p.1.1 \otimes r.0.0} \otimes \frac{\Gamma\colon r.0.2\vdash r.0.2}{\Gamma\colon p.1.1, r.0.0, r.0.2\vdash p.1.1 \otimes r.0.0 \otimes r.0.2} \otimes \frac{\Gamma\colon r.0.2\vdash r.0.2}{\Gamma\colon p.1.1, r.0.0, r.0.2\vdash p.1.1 \otimes r.0.0 \otimes r.0.2} \otimes \frac{\Gamma\colon r.1.0\vdash r.1.0}{\Gamma\colon p.1.1, r.0.0, r.0.2, r.1.0\vdash p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0} \otimes \frac{\Gamma\colon r.1.2\vdash r.1.2}{\Gamma\colon p.1.1, r.0.0, r.0.2, r.1.0\vdash p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0} \otimes \frac{\Gamma\colon r.1.2\vdash r.1.2}{\Gamma\colon p.1.1, r.0.0, r.0.2, r.1.0\vdash p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0} \otimes \frac{\Gamma\colon r.1.2\vdash r.1.2}{\Gamma\colon p.1.1, r.0.0, r.0.2, r.1.0\vdash p.1.1 \otimes r.0.0 \otimes r.0.2 \otimes r.1.0} \otimes \frac{\Gamma\colon r.1.2\vdash r.1.2}{\Gamma\colon p.1.1, r.0.0, r.0.2, r.1.0\vdash p.1.1 \otimes r.0.0} \otimes \frac{\Gamma\colon r.1.2\vdash r.1.2}{\Gamma\colon p.1.1, r.0.0, r.0.2, r.1.0\vdash p.1.1 \otimes r.0.0} \otimes \frac{\Gamma\colon r.1.2\vdash r.1.0}{\Gamma\colon p.1.1, r.0.0, r.0.2, r.1.0\vdash p.1.1 \otimes r.0.0} \otimes \frac{\Gamma\colon r.1.0\vdash r.1.0}{\Gamma\colon p.1.1, r.0.0, r.0.2, r.1.0\vdash p.1.1 \otimes r.0.0} \otimes \frac{\Gamma\colon r.1.0\vdash r.1.0}{\Gamma\colon p.1.1, r.0.0, r.0.2, r.1.0\vdash p.1.1 \otimes r.0.0} \otimes \frac{\Gamma\colon r.1.0\vdash r.1.0}{\Gamma\colon p.1.1, r.0.0, r.0.2, r.1.0} \otimes \frac{\Gamma\colon r.1.0\vdash r.1.0}{\Gamma\colon p.1.1, r.0.0, r.1.0} \otimes \frac{\Gamma\colon r.1.0\vdash r.1.0}{\Gamma\colon p.1.1, r.0.0, r.1.0} \otimes \frac{\Gamma\colon r.1.0\vdash r.1.0}{\Gamma\colon p.1.1, r.0.0} \otimes \frac{\Gamma\colon r.1.0\vdash r.1.0}{\Gamma\colon p.1.1, r.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  \overline{\Gamma:\ p\_1\_2\vdash p\_1\_2}\ \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          \frac{\Gamma: \ p\_1\_1, r\_0\_0, r\_0\_2, r\_1\_0, r\_1\_2 \vdash p\_1\_1 \otimes r\_0\_0 \otimes r\_0\_2 \otimes r\_1\_0 \otimes r\_1\_2}{\star}
                                                                                                                                                                                                                                                                                                                                  \Gamma : \Delta \vdash p\_1\_1 \otimes r\_0\_0 \otimes r\_0\_2 \otimes r\_1\_0 \otimes r\_1\_2
                                                                                                                                                                                     \Gamma: \ \Delta \vdash p\_1\_1 \otimes r\_0\_0 \otimes r\_0\_2 \otimes r\_1\_0 \otimes r\_1\_2
          file: MCC/ResAllocation_RAS-R-3_5_1.p (180 ms)
                                                                                                                                                                                                                                                                                                                                                                                                 \overline{\Gamma: p\_1\_2 \vdash p\_1\_2} \quad \overline{\Gamma: r\_0\_0 \vdash r\_0\_0}
                                                                                                                                                                                                                                                                                                                                                                                                                         \frac{\Gamma: \ p\_1\_2, r\_0\_0 \vdash p\_1\_2 \otimes r\_0\_0}{\Gamma: \ p\_1\_2, r\_0\_0 \vdash p\_1\_2 \otimes r\_0\_0} \otimes \frac{\Gamma: \ r\_0\_1 \vdash r\_0\_1}{\Gamma: \ r\_0\_1}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      \Gamma: r_{\underline{1}} \cup F_{\underline{1}}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          \Gamma: p_1_2, r_0_0, r_0_1 \vdash p_1_2 \otimes r_0_0 \otimes r_0_1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        \frac{0}{\Gamma: r_{-}1.1 \vdash r_{-}1.1} \otimes
\frac{\overline{\Gamma}: r\_0\_2 \vdash r\_0\_2}{\Gamma: r\_1\_2 \vdash r\_1\_2} \otimes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           \Gamma: p_1_2, r_0_0, r_0_1, r_1_0 \vdash p_1_2 \otimes r_0_0 \otimes r_0_1 \otimes r_1_0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           \Gamma: p_{-1-2}, r_{-0-0}, r_{-0-1}, r_{-1-0}, r_{-1-1} \vdash p_{-1-2} \otimes r_{-0-0} \otimes r_{-0-1} \otimes r_{-1-0} \otimes r_{-1-1}
                          \Gamma: r_0_2, r_1_2 \vdash r_0_2 \otimes r_1_2
                                                                                                                                                                                  \begin{array}{c} r.0.2 \otimes r.1.2 \\ \hline \Gamma \colon r.0.0, r.0.1, r.0.2, r.1.0, r.1.1, r.1.2, r.0.2 \otimes r.1.2 \multimap p.1.2 \vdash p.1.2 \otimes r.0.0 \otimes r.0.1 \otimes r.1.0 \otimes r.1.1 \\ \hline D_{G} \end{array} 
                                                                                                                                                                                                                                                                                          \Gamma: \ r\_0\_0, r\_0\_1, r\_0\_2, r\_1\_0, r\_1\_1, r\_1\_2 \vdash p\_1\_2 \underbrace{\otimes r\_0\_0 \otimes r\_0\_1 \otimes r\_1\_0 \otimes r\_1\_1}_{+}
                                                                                                                                                                                                                                                                                                                                                                                                                                                    \Gamma: \ \Delta \vdash p_{-1} = 2 \otimes r_{-0} = 0 \otimes r_{-0} = 1 \otimes r_{-1} = 0 \otimes r_{-1} = 1
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 $\label{eq:mcc/resallocation_RAS-R-5_100_1.p} \end{substitute} \begin{substitute} \mbox{MCC/ResAllocation_RAS-R-5_100_1.p} \end{substitute} \begin{substitute} \mbox{(7489 ms)} \end{substitute}$ MCC/ResAllocation_RAS-R-5_10_1.p (7495 ms) $\label{eq:mcc/resallocation_RAS-R-5_1_1.p} \mbox{ (25745 ms)}$ file: MCC/ResAllocation_RAS-R-5_20_1.p (4288 ms) MCC/ResAllocation_RAS-R-5_50_1.p (4306 ms) file: MCC/ResAllocation_RAS-R-5_5_1.p (6631 ms) file: MCC/RobotManipulation_robot-manipulation-1_100_1.p (432 ms)

```
file:
         {\tt MCC/RobotManipulation\_robot-manipulation-1\_10\_1.p\ (426\ ms)}
file: MCC/RobotManipulation_robot-manipulation-1_1_1.p (2206 ms)
                            \Delta \vdash access \otimes access \otimes initialize \otimes p\_'i1 \otimes p\_'i1 \otimes p\_'i2 \otimes r\_'stopped \otimes r\_'stopped
file:
         MCC/RobotManipulation_robot-manipulation-1_20_1.p (1543 ms)
file:
         MCC/RobotManipulation_robot-manipulation-1_50_1.p (1560 ms)
file:
         MCC/RobotManipulation_robot-manipulation-1_5_1.p (1217 ms)
```

```
MCC/RobotManipulation_robot-manipulation-2_100_1.p (95949 ms)
file:
file: MCC/RobotManipulation_robot-manipulation-2_10_1.p (94414 ms)
       MCC/SimpleLoadBal_simple_lbs-2_100_1.p (70864 ms)
file: MCC/SimpleLoadBal_simple_lbs-2_10_1.p (70801 ms)
      MCC/SimpleLoadBal_simple_lbs-2_1_1.p (9358 ms)
       MCC/SimpleLoadBal_simple_lbs-2_50_1.p (2881 ms)
file: MCC/SimpleLoadBal_simple_lbs-2_5_1.p (2937 ms)
file: MCC/TCPcondis_tcp5_1_1.p (21504 ms)
```

```
file:
                                                           MCC/TokenRing-5-unfolded_10_1.p (64817 ms)
                                                            MCC/TokenRing-5-unfolded_1_1.p (1749 ms)
     file:
                                                                                                                                                                                   \frac{\Gamma : \mathit{State}\_0.0 \vdash \mathit{State}\_0.0}{\Gamma : \mathit{State}\_1.0 \vdash \mathit{State}\_1.0 \vdash \mathit{State}\_1.0} \otimes \frac{\Gamma : \mathit{State}\_0.0, \mathit{State}\_1.0 \vdash \mathit{State}\_0.0 \otimes \mathit{State}\_1.0}{\Gamma : \mathit{State}\_0.0, \mathit{State}\_1.0, \mathit{State}\_2.2 \vdash \mathit{State}\_0.0 \otimes \mathit{State}\_1.0 \otimes \mathit{State}\_2.2}
                       \frac{1}{State\_0\_0} \vdash State\_0\_0 \quad \overline{\Gamma} : State\_1\_1 \vdash State\_1\_1 \\ State\_0\_0, State\_1\_1 \vdash State\_0\_0 \otimes State\_1\_1 \\ \otimes State\_0\_0, State\_1\_1 \vdash State\_0\_0 \otimes State\_1\_1 \\ \otimes State\_0\_0 \otimes State\_0\_1 \\ \otimes State\_0\_0 \otimes State\_0\_1 \\ \otimes State\_0\_0 \otimes State\_0\_1 \\ \otimes State\_0\_0 \otimes State\_0\_0 \\ \otimes State\_0\_0 \otimes S
                                                                                                                                                                                                                                                                                                                                                                                      \Delta \vdash State\_0\_0 \otimes State\_1\_0 \otimes State\_2\_2 \otimes State\_3\_3 \otimes State\_4\_4 \otimes State\_5\_5
                                                                                                                                                                                     \frac{4.4.\$ tate.5.5.\$ tate.0.0 \otimes \$ tate.1.1 - \$ \$ tate.1.0 \otimes \$ \$ tate.0.0 \cap \$ \$ tate.0.0 \otimes \$ \$ tate.1.1 \otimes \$ \$ tate.2.2 \otimes \$ \$ tate.3.3 \otimes \$ \$ tate.4.4 \otimes \$ \$ tate.5.5}{bc.2.2.\$ \$ tate.3.3 \otimes \$ \$ tate.4.4 \otimes \$ \$ tate.5.5} \\ \Gamma: \Delta \vdash \$ \$ tate.0.0 \otimes \$ \$ tate.1.0 \otimes \$ \$ tate.1.0 \otimes \$ \$ tate.2.2 \otimes \$ \$ tate.3.3 \otimes \$ \$ tate.4.4 \otimes \$ \$ tate.5.5} \\ \star
     file:
                                                            MCC/TokenRing-5-unfolded_5_1.p (6735 ms)
                                                           MCC/UtahNoC_1_1.p (75438 ms)
    file:
                                                           \frac{\overline{\Gamma} \colon p133 \vdash p133}{\Gamma \colon p133, p162 \vdash p133 \otimes p162} \otimes \frac{}{\Gamma \colon p191 \vdash p191} \otimes \frac{}{\Gamma \colon p191 \vdash p191} \otimes
                                                                                                                                                                                                                                                                                                                                       \frac{\overline{\Gamma:\ p215\vdash p215}}{\underline{\Gamma:\ p3\vdash p3}}\otimes\ \underline{\Gamma:\ p3\vdash p3}
                                                                                               \Gamma: p133, p162, p191 \vdash p133 \otimes p162 \otimes p191
                                                                                                                               \Gamma: p133, p162, p191, p215 \vdash p133 \otimes p162 \otimes p191 \otimes p215
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            \overline{\Gamma:\ p4\vdash p4}\ \otimes
                                                                                                                                                               \Gamma: p133, p162, p191, p215, p3 \vdash p133 \otimes p162 \otimes p191 \otimes p215 \otimes p3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     \Gamma: p133, p162, p191, p215, p3, p4 \vdash p133 \otimes p162 \otimes p191 \otimes p215 \otimes p3 \otimes p4
                                                                                                                                                                                                                                    \Gamma: \ p133, p162, p191, p215, p3, p4, p47 \vdash p133 \otimes p162 \otimes p191 \otimes p215 \otimes p3 \otimes p4 \otimes p47
                                                                                                                                                                                                                                                                         \Gamma: \ p133, p162, p191, p215, p3, p4, p47, p90 \vdash p133 \otimes p162 \otimes p191 \otimes p215 \otimes p3 \otimes p4 \otimes p47 \otimes p90 \\ \star \\ \star
                                                                                                                                                                                                                                                                                                                                                     \Gamma: \underbrace{\Delta \vdash p133 \otimes p162 \otimes p191 \otimes p215 \otimes p3 \otimes p4 \otimes p47 \otimes p90}_{} \  \, - \circ
\Gamma: p0 \vdash p0
                                              \frac{1}{\Gamma}: \underbrace{p0,p0 \rightarrow p3 \otimes p4 \otimes p47 \otimes p90 \otimes p133 \otimes p162 \otimes p191 \otimes p215}_{\Gamma} + \underbrace{p133 \otimes p162 \otimes p191 \otimes p215 \otimes p3 \otimes p4 \otimes p47 \otimes p90}_{\Gamma} \underbrace{D_{C}}_{\Gamma}
                                                                                                                                                                             \Gamma: \ p0 \vdash p133 \otimes p162 \otimes p191 \otimes p215 \otimes p3 \otimes p4 \otimes p47 \otimes p90
                                                                                                                                                                          \frac{\Gamma: \ \Delta \vdash p133 \otimes p162 \otimes p191 \otimes p215 \otimes p3 \otimes p4 \otimes p47 \otimes p90}{\Gamma: \ \Delta \vdash p133 \otimes p162 \otimes p191 \otimes p215 \otimes p3 \otimes p4 \otimes p47 \otimes p90} \star
```