

Benchmarking Linear Logic

Encoding Petri Nets

03 October 2018

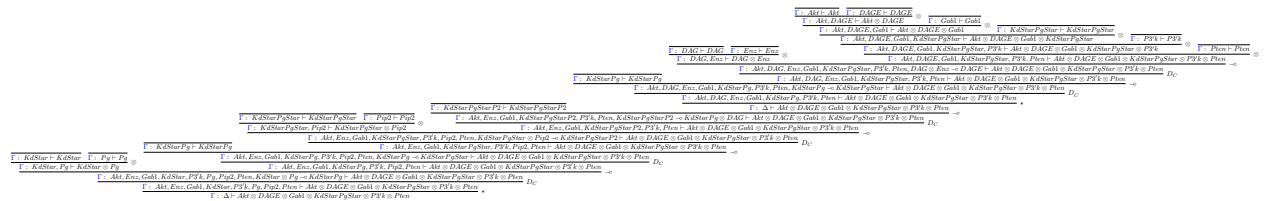
Abstract

Here we present the results for the petri-nets benchamrks in <https://github.com/carlosolarte/Linear-Logic-Prover-in-Maude>.

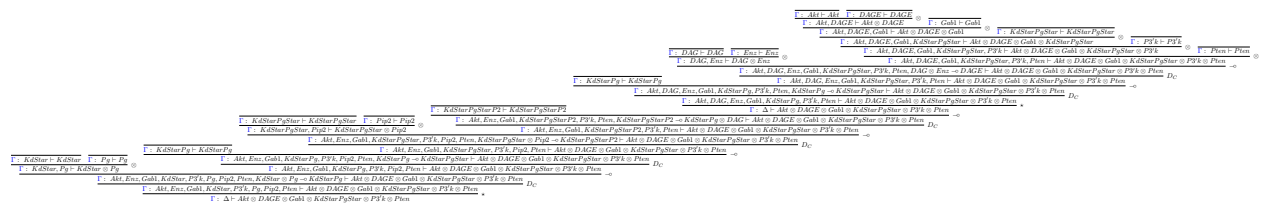
1 General Information

- Test run on a QEMU Virtual CPU, 2GHz, 64 bits, 2GB of RAM running Ubuntu.
- Timeout: 2min.
- 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).
- For the sake of readability, the classical context containing the encoding of transition rules is depicted as [F](#) 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: 2.073
- Proved sequents: 183

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



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



$$\begin{array}{c}
\frac{\frac{\frac{\Gamma: \text{Akt} \vdash \text{Akt} \quad \Gamma: \text{Enz} \vdash \text{Enz}}{\Gamma: \text{Akt}, \text{Enz} \vdash \text{Akt} \otimes \text{Enz}} \otimes \frac{\Gamma: \text{Gabl} \vdash \text{Gabl}}{\Gamma: \text{Akt}, \text{Enz}, \text{Gabl} \vdash \text{Akt} \otimes \text{Enz} \otimes \text{Gabl}} \otimes \frac{\Gamma: \text{KdStarPg} \vdash \text{KdStarPg}}{\Gamma: \text{Akt}, \text{Enz}, \text{Gabl}, \text{KdStarPg} \vdash \text{Akt} \otimes \text{Enz} \otimes \text{Gabl} \otimes \text{KdStarPg}} \otimes \frac{\Gamma: \text{P3'k} \vdash \text{P3'k}}{\Gamma: \text{Akt}, \text{Enz}, \text{Gabl}, \text{KdStarPg}, \text{P3'k} \vdash \text{Akt} \otimes \text{Enz} \otimes \text{Gabl} \otimes \text{KdStarPg} \otimes \text{P3'k}} \otimes \frac{\Gamma: \text{Pip2} \vdash \text{Pip2}}{\Gamma: \text{Akt}, \text{Enz}, \text{Gabl}, \text{KdStarPg}, \text{P3'k}, \text{Pip2} \vdash \text{Akt} \otimes \text{Enz} \otimes \text{Gabl} \otimes \text{KdStarPg} \otimes \text{P3'k} \otimes \text{Pip2}} \otimes \frac{\Gamma: \text{Pten} \vdash \text{Pten}}{\Gamma: \text{Akt}, \text{Enz}, \text{Gabl}, \text{KdStarPg}, \text{P3'k}, \text{Pip2}, \text{Pten} \vdash \text{Akt} \otimes \text{Enz} \otimes \text{Gabl} \otimes \text{KdStarPg} \otimes \text{P3'k} \otimes \text{Pip2} \otimes \text{Pten}} \otimes \\
\frac{\frac{\Gamma: \text{KdStar} \vdash \text{KdStar} \quad \Gamma: \text{Pg} \vdash \text{Pg}}{\Gamma: \text{KdStar}, \text{Pg} \vdash \text{KdStar} \otimes \text{Pg}} \otimes \frac{\Gamma: \text{Akt}, \text{Enz}, \text{Gabl}, \text{KdStar}, \text{P3'k}, \text{Pg}, \text{Pip2}, \text{Pten}, \text{KdStar} \otimes \text{Pg} \vdash \text{Akt} \otimes \text{Enz} \otimes \text{Gabl} \otimes \text{KdStarPg} \otimes \text{P3'k} \otimes \text{Pip2} \otimes \text{Pten}}{\Gamma: \text{Akt}, \text{Enz}, \text{Gabl}, \text{KdStar}, \text{P3'k}, \text{Pg}, \text{Pip2}, \text{Pten} \vdash \text{Akt} \otimes \text{Enz} \otimes \text{Gabl} \otimes \text{KdStarPg} \otimes \text{P3'k} \otimes \text{Pip2} \otimes \text{Pten}} \quad D_C \\
\frac{\Gamma: \Delta \vdash \text{Akt} \otimes \text{Enz} \otimes \text{Gabl} \otimes \text{KdStarPg} \otimes \text{P3'k} \otimes \text{Pip2} \otimes \text{Pten}}{\Gamma: \Delta \vdash \text{Akt} \otimes \text{Enz} \otimes \text{Gabl} \otimes \text{KdStarPg} \otimes \text{P3'k} \otimes \text{Pip2} \otimes \text{Pten}} \quad \star
\end{array}$$
[illegible][illegible][illegible]
$$\begin{array}{c}
\frac{\frac{\frac{\Gamma: p1 \vdash p1}{\Gamma: p1, p10 \vdash p1 \otimes p10} \otimes \frac{\Gamma: p17 \vdash p17}{\Gamma: p1, p10 \vdash p1 \otimes p10}}{\Gamma: p1, p10, p17 \vdash p1 \otimes p10 \otimes p17} \otimes \frac{\Gamma: p23 \vdash p23}{\Gamma: p1, p10, p17, p23 \vdash p1 \otimes p10 \otimes p17 \otimes p23} \otimes \frac{\Gamma: p29 \vdash p29}{\Gamma: p1, p10, p17, p23, p29 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29} \otimes \frac{\Gamma: p30 \vdash p30}{\Gamma: p1, p10, p17, p23, p29, p30 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30} \otimes \frac{\Gamma: p4 \vdash p4}{\Gamma: p1, p10, p17, p23, p29, p30, p4 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4} \otimes \frac{\Gamma: p7 \vdash p7}{\Gamma: p1, p10, p17, p23, p29, p30, p4, p7 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7} \otimes \frac{\Gamma: p8 \vdash p8}{\Gamma: p1, p10, p17, p23, p29, p30, p4, p7, p8 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8} \otimes \\
\frac{\Gamma: p9 \vdash p9}{\Gamma: p6 \vdash p6} \quad \frac{\Gamma: p1, p10, p17, p23, p29, p30, p4, p7, p9 \vdash p9 \multimap p8 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8}{\Gamma: p1, p10, p17, p23, p29, p30, p4, p7, p9 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8} \multimap_{D_C} \\
\frac{\Gamma: p3 \vdash p3}{\Gamma: p10, p17, p23, p29, p30, p6, p7, p9 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8} \multimap_{D_C} \\
\frac{\Gamma: p10, p17, p23, p29, p30, p6, p7, p9 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8}{\Gamma: p10, p17, p23, p29, p30, p6, p7, p9 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8} \multimap_{D_C} \star \\
\frac{\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 p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8} \multimap_{D_C} \\
\frac{\Gamma: p0 \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8}{\Gamma: \Delta \vdash p1 \otimes p10 \otimes p17 \otimes p23 \otimes p29 \otimes p30 \otimes p4 \otimes p7 \otimes p8} \star
\end{array}$$

2

file: MCC/AutoFlight_afcs_01_a_20_1.p (32941 ms)

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file: MCC/AutoFlight_afcs_01_a_5_1.p (40702 ms)
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file: MCC/AutoFlight_afcs_01_b_10_1.p (27227 ms)
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file: MCC/AutoFlight_afcs_02_b_10_1.p (52225 ms)
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$$\begin{array}{c}
\frac{\frac{\frac{\frac{\frac{\frac{\Gamma: p106 \vdash p106 \quad \Gamma: p118 \vdash p118}{\Gamma: p106, p118 \vdash p106 \otimes p118} \otimes \frac{\Gamma: p120 \vdash p120}{\Gamma: p120 \vdash p120} \otimes \frac{\Gamma: p125 \vdash p125}{\Gamma: p125 \vdash p125} \otimes \frac{\Gamma: p202 \vdash p202}{\Gamma: p202 \vdash p202} \otimes \frac{\Gamma: p6 \vdash p6}{\Gamma: p6 \vdash p6}}{\Gamma: p106, p118, p120 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} \otimes \frac{\Gamma: p103 \vdash p103}{\Gamma: p103 \vdash p103}}{\Gamma: p103, p118, p120, p125, p202, p6 \vdash p106 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C \\
\frac{\frac{\frac{\frac{\frac{\Gamma: p5 \vdash p5}{\Gamma: p5 \vdash p5}}{\Gamma: p119 \vdash p119} \otimes \frac{\Gamma: p118, p120, p125, p202, p5 \vdash p5 \vdash p103 \otimes p6 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6}{\Gamma: p118, p120, p125, p202, p5 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C}{\Gamma: p119, p120, p125, p202, p5, p19 \vdash p118 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C \\
\frac{\frac{\frac{\frac{\Gamma: p107 \vdash p107}{\Gamma: p107 \vdash p107}}{\Gamma: p107, p120, p125, p202, p5, p107 \vdash p119 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C}{\Gamma: p107, p120, p125, p202, p5 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C \\
\frac{\frac{\frac{\frac{\Gamma: p4 \vdash p4}{\Gamma: p4 \vdash p4}}{\Gamma: p120, p125, p202, p4 \vdash p107 \otimes p5 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C}{\Gamma: p120, p125, p202, p4 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C \\
\frac{\frac{\frac{\frac{\Gamma: p3 \vdash p3}{\Gamma: p3 \vdash p3}}{\Gamma: p125, p202, p3, p3 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C}{\Gamma: p125, p202, p3 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C \\
\frac{\frac{\frac{\frac{\Gamma: p124 \vdash p124}{\Gamma: p124, p3, p124 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C}{\Gamma: p124, p3 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C}{\Gamma: p1, p1 \vdash p124 \otimes p3 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C \\
\frac{\frac{\frac{\frac{\Gamma: p1 \vdash p1}{\Gamma: p1 \vdash p1}}{\Gamma: p2, p2 \vdash p1 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C}{\Gamma: p2, p2 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C \\
\frac{\frac{\frac{\frac{\Gamma: p0 \vdash p0}{\Gamma: p0 \vdash p0}}{\Gamma: p0, p0 \vdash p2 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C}{\Gamma: p0 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} D_C \\
\frac{\Gamma: \Delta \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6}{\Gamma: \Delta \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p6} \star
\end{array}$$

file: MCC/AutoFlight_afcs_02_b_1_1.p (258 ms)

$$\frac{\frac{\frac{\Gamma: p0 \vdash p0 \quad \Gamma: p2 \vdash p2}{\Gamma: p0, p0 \vdash p2 \vdash p2} \otimes \frac{\Gamma: p0 \vdash p2}{\Gamma: \Delta \vdash p2} \star}{\Gamma: \Delta \vdash p2} D_C$$

file: MCC/AutoFlight_afcs_02_b_5_1.p (1037 ms)

$$\begin{array}{c}
\frac{\frac{\frac{\frac{\frac{\frac{\Gamma: p120 \vdash p120 \quad \Gamma: p125 \vdash p125}{\Gamma: p120, p125 \vdash p120 \otimes p125} \otimes \frac{\Gamma: p202 \vdash p202}{\Gamma: p202 \vdash p202} \otimes \frac{\Gamma: p4 \vdash p4}{\Gamma: p4 \vdash p4}}{\Gamma: p120, p125, p202 \vdash p120 \otimes p125 \otimes p202 \otimes p4} \otimes \frac{\Gamma: p3 \vdash p3}{\Gamma: p3 \vdash p3}}{\Gamma: p125, p202, p3, p3 \vdash p120 \otimes p125 \otimes p202 \otimes p4} D_C \\
\frac{\frac{\frac{\frac{\frac{\Gamma: p124 \vdash p124}{\Gamma: p124, p3, p124 \vdash p106 \otimes p118 \otimes p120 \otimes p125 \otimes p202 \otimes p4} D_C}{\Gamma: p124, p3 \vdash p120 \otimes p125 \otimes p202 \otimes p4} \star}{\Gamma: \Delta \vdash p120 \otimes p125 \otimes p202 \otimes p4} \star}{\Gamma: p125, p202, p3, p3 \vdash p120 \otimes p125 \otimes p202 \otimes p4} D_C \\
\frac{\frac{\frac{\frac{\frac{\Gamma: p1 \vdash p1}{\Gamma: p1, p1 \vdash p124 \otimes p3 \vdash p120 \otimes p125 \otimes p202 \otimes p4} D_C}{\Gamma: p1 \vdash p120 \otimes p125 \otimes p202 \otimes p4} \star}{\Gamma: \Delta \vdash p120 \otimes p125 \otimes p202 \otimes p4} \star}{\Gamma: p2 \vdash p2} D_C \\
\frac{\frac{\frac{\frac{\Gamma: p0 \vdash p0}{\Gamma: p0, p0 \vdash p2 \vdash p120 \otimes p125 \otimes p202 \otimes p4} D_C}{\Gamma: p0 \vdash p120 \otimes p125 \otimes p202 \otimes p4} D_C}{\Gamma: \Delta \vdash p120 \otimes p125 \otimes p202 \otimes p4} \star
\end{array}$$

file: MCC/AutoFlight_afcs_03_b_1_1.p (621 ms)

$$\frac{\frac{\frac{\Gamma: p0 \vdash p0 \quad \Gamma: p2 \vdash p2}{\Gamma: p0, p0 \vdash p2 \vdash p2} \otimes \frac{\Gamma: p0 \vdash p2}{\Gamma: \Delta \vdash p2} \star}{\Gamma: \Delta \vdash p2} D_C$$

file: MCC/AutoFlight_afcs_03_b_5_1.p (2215 ms)

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file: MCC/AutoFlight_afcs_04_b_10_1.p (117074 ms)
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file: MCC/AutoFlight_afcs_04_b_1_1.p (1086 ms)
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file: MCC/AutoFlight_afcs_04_b_5_1.p (4650 ms)
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$$\begin{array}{c}
\frac{\frac{\frac{\frac{\frac{\frac{\Gamma : p248 \vdash p248 \quad \Gamma : p3 \vdash p3}{\Gamma : p248, p3 \vdash p248 \otimes p3} \otimes \frac{\Gamma : p369 \vdash p369}{\Gamma : p248, p3, p369 \vdash p248 \otimes p3 \otimes p369} \otimes \frac{\Gamma : p386 \vdash p386}{\Gamma : p248, p3, p369, p386 \vdash p248 \otimes p3 \otimes p369 \otimes p386} \star}{\Gamma : p248, p3, p369, p386 \vdash p248 \otimes p3 \otimes p369 \otimes p386} \star}{\frac{\Gamma : p247 \vdash p247}{\Gamma : p247, p3, p386, p247 \multimap p369 \otimes p248 \vdash p248 \otimes p3 \otimes p369 \otimes p386} \multimap \frac{\Gamma : \Delta \vdash p248 \otimes p3 \otimes p369 \otimes p386}{\Gamma : p247, p3, p386 \vdash p248 \otimes p3 \otimes p369 \otimes p386} \star}{\Gamma : p246 \vdash p246} \multimap \frac{\Gamma : \Delta \vdash p248 \otimes p3 \otimes p369 \otimes p386}{\Gamma : p246, p3, p246 \multimap p386 \otimes p247 \vdash p248 \otimes p3 \otimes p369 \otimes p386} \star}{\Gamma : p1 \vdash p1} \multimap \frac{\Gamma : \Delta \vdash p248 \otimes p3 \otimes p369 \otimes p386}{\Gamma : p1, p1 \multimap p246 \otimes p3 \vdash p248 \otimes p3 \otimes p369 \otimes p386} \star}{\Gamma : p2 \vdash p2} \multimap \frac{\Gamma : p2, p2 \multimap p1 \vdash p248 \otimes p3 \otimes p369 \otimes p386}{\Gamma : p2 \vdash p248 \otimes p3 \otimes p369 \otimes p386} \multimap \frac{\Gamma : p0 \vdash p0}{\Gamma : p0, p0 \multimap p2 \vdash p248 \otimes p3 \otimes p369 \otimes p386} \multimap \frac{\Gamma : p0 \vdash p248 \otimes p3 \otimes p369 \otimes p386}{\Gamma : \Delta \vdash p248 \otimes p3 \otimes p369 \otimes p386} \star
\end{array}$$

file: MCC/AutoFlight_afcs_05_b_1_1.p (1814 ms)

$$\begin{array}{c}
\frac{\frac{\Gamma : p0 \vdash p0 \quad \Gamma : p2 \vdash p2}{\Gamma : p0, p0 \multimap p2 \vdash p2} \multimap}{\Gamma : p0 \vdash p2} \star \quad D_C
\end{array}$$

file: MCC/AutoFlight_afcs_05_b_5_1.p (7526 ms)

$$\begin{array}{c}
\frac{\frac{\frac{\frac{\frac{\frac{\frac{\Gamma : p3 \vdash p3 \quad \Gamma : p309 \vdash p309}{\Gamma : p3, p309 \vdash p3 \otimes p309} \otimes \frac{\Gamma : p461 \vdash p461}{\Gamma : p3, p309, p461 \vdash p3 \otimes p309 \otimes p461} \otimes \frac{\Gamma : p478 \vdash p478}{\Gamma : p3, p309, p461, p478 \vdash p3 \otimes p309 \otimes p461 \otimes p478} \star}{\Gamma : p3, p309, p461, p478 \vdash p3 \otimes p309 \otimes p461 \otimes p478} \star}{\frac{\Gamma : p308 \vdash p308}{\Gamma : p3, p308, p478, p308 \multimap p461 \otimes p309 \vdash p3 \otimes p309 \otimes p461 \otimes p478} \multimap \frac{\Gamma : \Delta \vdash p3 \otimes p309 \otimes p461 \otimes p478}{\Gamma : p3, p308, p478 \vdash p3 \otimes p309 \otimes p461 \otimes p478} \star}{\Gamma : p307 \vdash p307} \multimap \frac{\Gamma : \Delta \vdash p3 \otimes p309 \otimes p461 \otimes p478}{\Gamma : p3, p307, p307 \multimap p478 \otimes p308 \vdash p3 \otimes p309 \otimes p461 \otimes p478} \star}{\Gamma : p1 \vdash p1} \multimap \frac{\Gamma : \Delta \vdash p3 \otimes p309 \otimes p461 \otimes p478}{\Gamma : p1, p1 \multimap p307 \otimes p3 \vdash p3 \otimes p309 \otimes p461 \otimes p478} \star}{\Gamma : p2 \vdash p2} \multimap \frac{\Gamma : p2, p2 \multimap p1 \vdash p3 \otimes p309 \otimes p461 \otimes p478}{\Gamma : p2 \vdash p3 \otimes p309 \otimes p461 \otimes p478} \multimap \frac{\Gamma : p0 \vdash p0}{\Gamma : p0, p0 \multimap p2 \vdash p3 \otimes p309 \otimes p461 \otimes p478} \multimap \frac{\Gamma : p0 \vdash p3 \otimes p309 \otimes p461 \otimes p478}{\Gamma : \Delta \vdash p3 \otimes p309 \otimes p461 \otimes p478} \star
\end{array}$$

file: MCC/AutoFlight_afcs_06_b_1_1.p (2507 ms)

$$\begin{array}{c}
\frac{\frac{\Gamma : p0 \vdash p0 \quad \Gamma : p2 \vdash p2}{\Gamma : p0, p0 \multimap p2 \vdash p2} \multimap}{\Gamma : p0 \vdash p2} \star \quad D_C
\end{array}$$

file: MCC/AutoFlight_afcs_06_b_5_1.p (10496 ms)

file: MCC/CircadianClock_circadian_clock-000001_5_1.p (1510 ms)

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file: MCC/CloudDeployment_deploy_2_a_100_1.p (73332 ms)
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file: MCC/CloudDeployment_deploy_2_a_10_1.p (73172 ms)
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file: MCC/CloudDeployment_deploy_2_a_1_1.p (73937 ms)
```


$$\begin{array}{c}
\frac{\Gamma : p1 \vdash p1 \quad \Gamma : p552 \vdash p552}{\Gamma : p1, p552 \vdash p1 \otimes p552} \otimes \\
\frac{\Gamma : p0 \vdash p0 \quad \Gamma : \Delta \vdash p1 \otimes p552}{\Gamma : p0, p0 \multimap p552 \otimes p1 \vdash p1 \otimes p552} \star \\
\frac{\Gamma : p0 \vdash p1 \otimes p552}{\Gamma : \Delta \vdash p1 \otimes p552} \multimap D_C
\end{array}$$

file: MCC/CloudDeployment_deploy_2_b_5_1.p (14653 ms)

$$\begin{array}{c}
\frac{\Gamma : p266 \vdash p266 \quad \Gamma : p3 \vdash p3}{\Gamma : p266, p3 \vdash p266 \otimes p3} \otimes \frac{\Gamma : p547 \vdash p547}{\Gamma : p266, p3, p547 \vdash p266 \otimes p3 \otimes p547} \otimes \frac{\Gamma : p554 \vdash p554}{\Gamma : p266, p3, p547, p554 \vdash p266 \otimes p3 \otimes p547 \otimes p554} \otimes \\
\frac{\Gamma : p552 \vdash p552}{\Gamma : p266, p3, p547, p552 \multimap p554 \vdash p266 \otimes p3 \otimes p547 \otimes p554} \multimap D_C \\
\frac{\Gamma : p529 \vdash p529}{\Gamma : p266, p3, p529, p552, p529 \multimap p547 \vdash p266 \otimes p3 \otimes p547 \otimes p554} \multimap D_C \\
\frac{\Gamma : p266, p3, p529, p552 \vdash p266 \otimes p3 \otimes p547 \otimes p554}{\Gamma : \Delta \vdash p266 \otimes p3 \otimes p547 \otimes p554} \star \\
\frac{\Gamma : p2 \vdash p2}{\Gamma : p2, p529, p552, p2 \multimap p266 \otimes p3 \vdash p266 \otimes p3 \otimes p547 \otimes p554} \multimap D_C \\
\frac{\Gamma : p2, p529, p552 \vdash p266 \otimes p3 \otimes p547 \otimes p554}{\Gamma : \Delta \vdash p266 \otimes p3 \otimes p547 \otimes p554} \star \\
\frac{\Gamma : p1 \vdash p1}{\Gamma : p1, p552, p1 \multimap p529 \otimes p2 \vdash p266 \otimes p3 \otimes p547 \otimes p554} \multimap D_C \\
\frac{\Gamma : p1, p552 \vdash p266 \otimes p3 \otimes p547 \otimes p554}{\Gamma : \Delta \vdash p266 \otimes p3 \otimes p547 \otimes p554} \star \\
\frac{\Gamma : p0 \vdash p0}{\Gamma : p0, p0 \multimap p552 \otimes p1 \vdash p266 \otimes p3 \otimes p547 \otimes p554} \multimap D_C \\
\frac{\Gamma : p0 \vdash p266 \otimes p3 \otimes p547 \otimes p554}{\Gamma : \Delta \vdash p266 \otimes p3 \otimes p547 \otimes p554} \star
\end{array}$$

file: MCC/CloudDeployment_deploy_3_b_1_1.p (14630 ms)

$$\begin{array}{c}
\frac{\Gamma : p1 \vdash p1 \quad \Gamma : p855 \vdash p855}{\Gamma : p1, p855 \vdash p1 \otimes p855} \otimes \\
\frac{\Gamma : p0 \vdash p0 \quad \Gamma : \Delta \vdash p1 \otimes p855}{\Gamma : p0, p0 \multimap p855 \otimes p1 \vdash p1 \otimes p855} \star \\
\frac{\Gamma : p0 \vdash p1 \otimes p855}{\Gamma : \Delta \vdash p1 \otimes p855} \multimap D_C
\end{array}$$

file: MCC/CloudDeployment_deploy_3_b_5_1.p (47945 ms)

file: MCC/DES_des_01_b_5_1.p (4583 ms)

$$\begin{array}{c}
\frac{\frac{\frac{\Gamma: p11 \vdash p11}{\Gamma: p11, p132 \vdash p11 \otimes p132} \otimes \frac{\Gamma: p14 \vdash p14}{\Gamma: p11, p132, p14 \vdash p11 \otimes p132 \otimes p14} \otimes \frac{\Gamma: p276 \vdash p276}{\Gamma: p11, p132, p14, p276 \vdash p11 \otimes p132 \otimes p14 \otimes p276} \otimes \frac{\Gamma: p4 \vdash p4}{\Gamma: p11, p132, p14, p276, p4 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4} \otimes \frac{\Gamma: p9 \vdash p9}{\Gamma: p11, p132, p14, p276, p4, p9 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \otimes \\
\frac{\Gamma: p3 \vdash p3}{\Gamma: p11, p132, p14, p276, p3, p3 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \otimes \frac{\Gamma: \Delta \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\Gamma: p11, p132, p14, p276, p3, p3 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \otimes \\
\frac{\Gamma: p131 \vdash p131}{\Gamma: p11, p131, p14, p3, p131 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \otimes \frac{\Gamma: \Delta \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\Gamma: p11, p131, p14, p3 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \otimes \\
\frac{\Gamma: p13 \vdash p13}{\Gamma: p11, p13, p3, p13 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \otimes \frac{\Gamma: \Delta \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\Gamma: p11, p13, p3 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \otimes \\
\frac{\Gamma: p1 \vdash p1}{\Gamma: p1, p13, p1 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \otimes \frac{\Gamma: \Delta \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\Gamma: p1, p13 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \otimes \\
\frac{\Gamma: p0 \vdash p0}{\Gamma: p0, p0 \vdash p13 \otimes p1 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \otimes \frac{\Gamma: \Delta \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9}{\Gamma: p0 \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \otimes \\
\frac{\Gamma: p0 \vdash p0}{\Gamma: \Delta \vdash p11 \otimes p132 \otimes p14 \otimes p276 \otimes p4 \otimes p9} \star
\end{array}$$

file: MCC/DES_des_02_b_1_1.p (800 ms)

$$\begin{array}{c}
\frac{\frac{\Gamma: p1 \vdash p1}{\Gamma: p1, p17 \vdash p1 \otimes p17} \otimes \frac{\Gamma: p17 \vdash p17}{\Gamma: p1, p17 \vdash p1 \otimes p17} \star \\
\frac{\Gamma: p0 \vdash p0}{\Gamma: \Delta \vdash p1 \otimes p17} \otimes \\
\frac{\Gamma: p0, p0 \vdash p17 \otimes p1 \vdash p1 \otimes p17}{\Gamma: p0 \vdash p1 \otimes p17} D_C \\
\frac{\Gamma: p0 \vdash p1 \otimes p17}{\Gamma: \Delta \vdash p1 \otimes p17} \star
\end{array}$$

file: MCC/DES_des_02_b_5_1.p (4673 ms)

$$\begin{array}{c}
\frac{\frac{\frac{\frac{\Gamma: p11 \vdash p11}{\Gamma: p11, p136 \vdash p11 \otimes p136} \otimes \frac{\Gamma: p14 \vdash p14}{\Gamma: p11, p136, p14 \vdash p11 \otimes p136 \otimes p14} \otimes \frac{\Gamma: p18 \vdash p18}{\Gamma: p11, p136, p14, p18 \vdash p11 \otimes p136 \otimes p14 \otimes p18} \otimes \frac{\Gamma: p280 \vdash p280}{\Gamma: p11, p136, p14, p18, p280 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280} \otimes \frac{\Gamma: p4 \vdash p4}{\Gamma: p11, p136, p14, p18, p280, p4 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \otimes \\
\frac{\Gamma: p3 \vdash p3}{\Gamma: p136, p14, p18, p280, p3, p3 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \otimes \frac{\Gamma: \Delta \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4}{\Gamma: p136, p14, p18, p280, p3 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \otimes \\
\frac{\Gamma: p135 \vdash p135}{\Gamma: p135, p14, p18, p3, p135 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \otimes \frac{\Gamma: \Delta \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4}{\Gamma: p135, p14, p18, p3 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \otimes \\
\frac{\Gamma: p17 \vdash p17}{\Gamma: p14, p17, p3, p17 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \otimes \frac{\Gamma: \Delta \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4}{\Gamma: p14, p17, p3 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \otimes \\
\frac{\Gamma: p1 \vdash p1}{\Gamma: p1, p17, p1 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \otimes \frac{\Gamma: \Delta \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4}{\Gamma: p1, p17 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \otimes \\
\frac{\Gamma: p0 \vdash p0}{\Gamma: p0, p0 \vdash p17 \otimes p1 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \otimes \frac{\Gamma: \Delta \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4}{\Gamma: p0 \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \otimes \\
\frac{\Gamma: p0 \vdash p0}{\Gamma: \Delta \vdash p11 \otimes p136 \otimes p14 \otimes p18 \otimes p280 \otimes p4} \star
\end{array}$$

file: MCC/DES_des_05_b_1_1.p (877 ms)

$$\begin{array}{c}
\frac{\Gamma : p1 \vdash p1 \quad \Gamma : p29 \vdash p29}{\Gamma : p1, p29 \vdash p1 \otimes p29} \otimes \\
\frac{\Gamma : p0 \vdash p0 \quad \Gamma : \Delta \vdash p1 \otimes p29}{\Gamma : p0, p0 \multimap p29 \otimes p1 \vdash p1 \otimes p29} \star \\
\frac{\Gamma : p0 \vdash p1 \otimes p29}{\Gamma : \Delta \vdash p1 \otimes p29} D_C
\end{array}$$

file: MCC/DES_des_05_b_5_1.p (5271 ms)

$$\begin{array}{c}
\frac{\Gamma : p148 \vdash p148 \quad \Gamma : p17 \vdash p17}{\Gamma : p148, p17 \vdash p148 \otimes p17} \otimes \quad \frac{\Gamma : p23 \vdash p23}{\Gamma : p148, p17, p23 \vdash p148 \otimes p17 \otimes p23} \otimes \quad \frac{\Gamma : p292 \vdash p292}{\Gamma : p148, p17, p23, p292 \vdash p148 \otimes p17 \otimes p23 \otimes p292} \otimes \quad \frac{\Gamma : p30 \vdash p30}{\Gamma : p148, p17, p23, p292, p30 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30} \otimes \quad \frac{\Gamma : p4 \vdash p4}{\Gamma : p148, p17, p23, p292, p30, p4 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \otimes \\
\frac{\Gamma : p3 \vdash p3}{\Gamma : p148, p23, p292, p3, p30, p3 \multimap p17 \otimes p4 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \multimap \quad \frac{\Gamma : \Delta \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4}{\Gamma : p148, p23, p292, p3, p30, p3 \multimap p17 \otimes p4 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \star \\
\frac{\Gamma : p147 \vdash p147}{\Gamma : p147, p23, p3, p30, p147 \multimap p292 \otimes p148 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \multimap \quad \frac{\Gamma : \Delta \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4}{\Gamma : p147, p23, p3, p30, p147 \multimap p292 \otimes p148 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \star \\
\frac{\Gamma : p29 \vdash p29}{\Gamma : p23, p29, p3, p29 \multimap p147 \otimes p30 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \multimap \quad \frac{\Gamma : \Delta \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4}{\Gamma : p23, p29, p3, p29 \multimap p147 \otimes p30 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \star \\
\frac{\Gamma : p1 \vdash p1}{\Gamma : p1, p29, p1 \multimap p23 \otimes p3 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \multimap \quad \frac{\Gamma : \Delta \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4}{\Gamma : p1, p29, p1 \multimap p23 \otimes p3 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \star \\
\frac{\Gamma : p0 \vdash p0}{\Gamma : p0, p0 \multimap p29 \otimes p1 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \multimap \quad \frac{\Gamma : \Delta \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4}{\Gamma : p0, p0 \multimap p29 \otimes p1 \vdash p148 \otimes p17 \otimes p23 \otimes p292 \otimes p30 \otimes p4} \star \\
\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
\end{array}$$

file: MCC/DES_des_10_b_1_1.p (1171 ms)

$$\begin{array}{c}
\frac{\Gamma : p1 \vdash p1 \quad \Gamma : p49 \vdash p49}{\Gamma : p1, p49 \vdash p1 \otimes p49} \otimes \\
\frac{\Gamma : p0 \vdash p0 \quad \Gamma : \Delta \vdash p1 \otimes p49}{\Gamma : p0, p0 \multimap p49 \otimes p1 \vdash p1 \otimes p49} \star \\
\frac{\Gamma : p0 \vdash p1 \otimes p49}{\Gamma : \Delta \vdash p1 \otimes p49} D_C
\end{array}$$

file: MCC/DES_des_10_b_5_1.p (6703 ms)

$$\begin{array}{c}
\frac{\Gamma : p168 \vdash p168 \quad \Gamma : p27 \vdash p27}{\Gamma : p168, p27 \vdash p168 \otimes p27} \otimes \quad \frac{\Gamma : p312 \vdash p312}{\Gamma : p168, p27, p312 \vdash p168 \otimes p27 \otimes p312} \otimes \quad \frac{\Gamma : p38 \vdash p38}{\Gamma : p168, p27, p312, p38 \vdash p168 \otimes p27 \otimes p312 \otimes p38} \otimes \quad \frac{\Gamma : p4 \vdash p4}{\Gamma : p168, p27, p312, p38, p4 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4} \otimes \quad \frac{\Gamma : p50 \vdash p50}{\Gamma : p168, p27, p312, p38, p4, p50 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \otimes \\
\frac{\Gamma : p167 \vdash p167}{\Gamma : p167, p27, p38, p4, p50, p167 \multimap p312 \otimes p168 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \multimap \quad \frac{\Gamma : \Delta \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50}{\Gamma : p167, p27, p38, p4, p50, p167 \multimap p312 \otimes p168 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \star \\
\frac{\Gamma : p49 \vdash p49}{\Gamma : p27, p38, p4, p49, p49 \multimap p167 \otimes p50 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \multimap \quad \frac{\Gamma : \Delta \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50}{\Gamma : p27, p38, p4, p49, p49 \multimap p167 \otimes p50 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \star \\
\frac{\Gamma : p3 \vdash p3}{\Gamma : p3, p38, p49, p3 \multimap p27 \otimes p4 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \multimap \quad \frac{\Gamma : \Delta \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50}{\Gamma : p3, p38, p49, p3 \multimap p27 \otimes p4 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \star \\
\frac{\Gamma : p1 \vdash p1}{\Gamma : p1, p49, p1 \multimap p38 \otimes p3 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \multimap \quad \frac{\Gamma : \Delta \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50}{\Gamma : p1, p49, p1 \multimap p38 \otimes p3 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \star \\
\frac{\Gamma : p0 \vdash p0}{\Gamma : p0, p0 \multimap p49 \otimes p1 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \multimap \quad \frac{\Gamma : \Delta \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50}{\Gamma : p0, p0 \multimap p49 \otimes p1 \vdash p168 \otimes p27 \otimes p312 \otimes p38 \otimes p4 \otimes p50} \star
\end{array}$$

file: MCC/DES_des_20_b_1_1.p (1653 ms)

$$\begin{array}{c}
\frac{\Gamma : p1 \vdash p1 \quad \Gamma : p89 \vdash p89}{\Gamma : p1, p89 \vdash p1 \otimes p89} \otimes \\
\frac{\Gamma : p0 \vdash p0 \quad \Gamma : \Delta \vdash p1 \otimes p89}{\Gamma : p0, p0 \multimap p89 \otimes p1 \vdash p1 \otimes p89} \star \\
\frac{\Gamma : p0 \vdash p1 \otimes p89}{\Gamma : \Delta \vdash p1 \otimes p89} \multimap \quad D_C
\end{array}$$

file: MCC/DES_des_20_b_5_1.p (8575 ms)

$$\begin{array}{c}
\frac{\Gamma : p208 \vdash p208 \quad \Gamma : p352 \vdash p352}{\Gamma : p208, p352 \vdash p208 \otimes p352} \otimes \quad \frac{\Gamma : p4 \vdash p4}{\Gamma : p208, p352, p4 \vdash p208 \otimes p352 \otimes p4} \otimes \quad \frac{\Gamma : p47 \vdash p47}{\Gamma : p208, p352, p4, p47 \vdash p208 \otimes p352 \otimes p4 \otimes p47} \otimes \quad \frac{\Gamma : p68 \vdash p68}{\Gamma : p208, p352, p4, p47, p68 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68} \otimes \quad \frac{\Gamma : p90 \vdash p90}{\Gamma : p208, p352, p4, p47, p68, p90 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \otimes \\
\frac{\Gamma : p207 \vdash p207}{\Gamma : p207, p4, p47, p68, p90, p207 \multimap p352 \otimes p208 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \multimap \quad \frac{\Gamma : \Delta \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90}{\Gamma : p207, p4, p47, p68, p90 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \star \\
\frac{\Gamma : p89 \vdash p89}{\Gamma : p4, p47, p68, p89, p89 \multimap p207 \otimes p90 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \multimap \quad \frac{\Gamma : \Delta \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90}{\Gamma : p4, p47, p68, p89 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \star \\
\frac{\Gamma : p3 \vdash p3}{\Gamma : p3, p68, p89, p3 \multimap p47 \otimes p4 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \multimap \quad \frac{\Gamma : \Delta \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90}{\Gamma : p3, p68, p89 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \star \\
\frac{\Gamma : p1 \vdash p1}{\Gamma : p1, p89, p1 \multimap p68 \otimes p3 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \multimap \quad \frac{\Gamma : \Delta \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90}{\Gamma : p1, p89 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \star \\
\frac{\Gamma : p0 \vdash p0}{\Gamma : p0, p0 \multimap p89 \otimes p1 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \multimap \quad \frac{\Gamma : \Delta \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90}{\Gamma : p0 \vdash p208 \otimes p352 \otimes p4 \otimes p47 \otimes p68 \otimes p90} \star \\
\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
\end{array}$$

file: MCC/DES_des_30_b_1_1.p (2247 ms)

$$\begin{array}{c}
\frac{\Gamma : p1 \vdash p1 \quad \Gamma : p128 \vdash p128}{\Gamma : p1, p128 \vdash p1 \otimes p128} \otimes \\
\frac{\Gamma : p0 \vdash p0 \quad \Gamma : \Delta \vdash p1 \otimes p128}{\Gamma : p0, p0 \multimap p128 \otimes p1 \vdash p1 \otimes p128} \star \\
\frac{\Gamma : p0 \vdash p1 \otimes p128}{\Gamma : \Delta \vdash p1 \otimes p128} \multimap \quad D_C
\end{array}$$

file: MCC/DES_des_30_b_5_1.p (10376 ms)


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file: MCC/DES_des_50_b_5_1.p (14970 ms)
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$$\begin{array}{c}
\frac{\Gamma : p106 \vdash p106 \quad \Gamma : p157 \vdash p157}{\Gamma : p106, p157 \vdash p106 \otimes p157} \otimes \quad \frac{\Gamma : p209 \vdash p209}{\Gamma : p106, p157, p209 \vdash p106 \otimes p157 \otimes p209} \otimes \quad \frac{\Gamma : p326 \vdash p326}{\Gamma : p106, p157, p209, p326 \vdash p106 \otimes p157 \otimes p209 \otimes p326} \otimes \quad \frac{\Gamma : p5 \vdash p5}{\Gamma : p106, p157, p209, p326, p5 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5} \otimes \quad \frac{\Gamma : p55 \vdash p55}{\Gamma : p106, p157, p209, p326, p5, p55 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} \otimes \\
\frac{\Gamma : p4 \vdash p4}{\Gamma : p106, p157, p209, p326, p4, p4 \multimap p55 \otimes p5 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} \multimap \quad \frac{\Gamma : \Delta \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55}{\Gamma : p106, p157, p209, p326, p4 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} D_C \\
\frac{\Gamma : p3 \vdash p3}{\Gamma : p157, p209, p3, p326, p3 \multimap p106 \otimes p4 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} \multimap \quad \frac{\Gamma : \Delta \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55}{\Gamma : p157, p209, p3, p326 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} D_C \\
\frac{\Gamma : p208 \vdash p208}{\Gamma : p157, p208, p3, p208 \multimap p326 \otimes p209 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} \multimap \quad \frac{\Gamma : \Delta \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55}{\Gamma : p157, p208, p3 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} D_C \\
\frac{\Gamma : p1 \vdash p1}{\Gamma : p1, p208, p1 \multimap p157 \otimes p3 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} \multimap \quad \frac{\Gamma : \Delta \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55}{\Gamma : p1, p208 \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} D_C \\
\frac{\Gamma : p0 \vdash p0}{\Gamma : \Delta \vdash p106 \otimes p157 \otimes p209 \otimes p326 \otimes p5 \otimes p55} \multimap \quad \frac{\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} D_C \\
\frac{\Gamma : \Delta \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} *
\end{array}$$

file: MCC/DES_des_60_b_1_1.p (3800 ms)

$$\frac{\frac{\frac{\overline{\Gamma : p1 \vdash p1} \quad \overline{\Gamma : p248 \vdash p248}}{\overline{\Gamma : p1, p248 \vdash p1 \otimes p248}} \otimes \quad \frac{\overline{\Gamma : p0 \vdash p0}}{\overline{\Gamma : \Delta \vdash p1 \otimes p248}} \star}{\frac{\overline{\Gamma : p0, p0 \multimap p248 \otimes p1 \vdash p1 \otimes p248}}{\overline{\Gamma : p0 \vdash p1 \otimes p248}} \multimap \quad \star} D_C \quad \star$$

file: MCC/DES_des_60_b_5_1.p (17502 ms)

$$\begin{array}{c}
\frac{\frac{\frac{\frac{\frac{\frac{\Gamma: p126 \vdash p126 \quad \Gamma: p187 \vdash p187}{\Gamma: p126, p187 \vdash p126 \otimes p187} \quad \frac{\Gamma: p249 \vdash p249}{\Gamma: p126, p187, p249 \vdash p126 \otimes p187 \otimes p249}}{\Gamma: p126, p187, p249, p366 \vdash p126 \otimes p187 \otimes p249 \otimes p366} \otimes \frac{\Gamma: p366 \vdash p366}{\Gamma: p5 \vdash p5}}{\Gamma: p126, p187, p249, p366, p5 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5} \otimes \frac{\Gamma: p65 \vdash p65}{\Gamma: p126, p187, p249, p366, p5, p65 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65}}{\Gamma: p4 \vdash p4} \star \\
\frac{\frac{\frac{\frac{\frac{\Gamma: p126, p187, p249, p366, p4, p4 \multimap p65 \otimes p5 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65}{\Gamma: p126, p187, p249, p366, p4 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \quad D_C}{\Gamma: \Delta \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \multimap}{\Gamma: p126, p187, p249, p3, p366, p3 \multimap p126 \otimes p4 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \quad D_C}{\Gamma: p187, p249, p3, p366 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \star \\
\frac{\frac{\frac{\frac{\frac{\Gamma: p248 \vdash p248}{\Gamma: p187, p248, p3, p248 \multimap p366 \otimes p249 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \quad D_C}{\Gamma: p187, p248, p3 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \quad D_C}{\Gamma: \Delta \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \star \\
\frac{\frac{\frac{\frac{\Gamma: p1 \vdash p1}{\Gamma: p1, p248, p1 \multimap p187 \otimes p3 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \quad D_C}{\Gamma: p1, p248 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \quad D_C}{\Gamma: \Delta \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \star \\
\frac{\frac{\frac{\Gamma: p0 \vdash p0}{\Gamma: p0, p0 \multimap p248 \otimes p1 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \quad D_C}{\Gamma: p0 \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \quad D_C}{\Gamma: \Delta \vdash p126 \otimes p187 \otimes p249 \otimes p366 \otimes p5 \otimes p65} \star
\end{array}$$

```
file: MCC/DatabaseWithMutex_database2UNFOLD_100_1.p (732 ms)
```

```
file: MCC/DatabaseWithMutex_database2UNFOLD_10_1.p (248 ms)
```

[illegible]

```
file: MCC/DatabaseWithMutex_database2UNFOLD_1_1.p (510 ms)
```

[illegible]

```
file: MCC/DatabaseWithMutex database2UNFOLD 20 1.p (701 ms)
```

```
file: MCC/DatabaseWithMutex_database2UNFOLD_50_1.p (263 ms)
```

[illegible]

```
file: MCC/DatabaseWithMutex_database2UNFOLD_5_1.p (861 ms)
```

[illegible]

```
file: MCC/Diffusion2D_2D8_gradient_10x10_10_1_1.p (17383 ms)
```

[illegible]

file: MCC/Diffusion2D 2D8_gradient_10x10_10_5_1.p (21486 ms)

[illegible]

file: MCC/Diffusion2D_2D8_gradient_5x5_10_1_1.p (3563 ms)

[illegible]

```
file: MCC/ERK erk-000001 100 1.p (161 ms)
```


file: MCC/Eratosthenes_eratosthenes-010_5_1.p (6028 ms)

file: MCC/FlexibleBarrier_flexbar_04_a_100_1.p (86923 ms)

file: MCC/FlexibleBarrier_flexbar_04_a_10_1.p (88452 ms)

file: MCC/FlexibleBarrier_flexbar_04_a_1_1.p (800 ms)

$$\begin{array}{c}
\frac{\frac{\Gamma : p11 \vdash p11 \quad \Gamma : p24 \vdash p24}{\Gamma : p11, p24 \vdash p11 \otimes p24} \otimes \frac{\Gamma : p34 \vdash p34}{\Gamma : p11, p24, p34 \vdash p11 \otimes p24 \otimes p34} \otimes \frac{\Gamma : p48 \vdash p48}{\Gamma : p11, p24, p34, p48 \vdash p11 \otimes p24 \otimes p34 \otimes p48} \otimes \frac{\Gamma : p49 \vdash p49}{\Gamma : p11, p24, p34, p48, p49 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49} \otimes \frac{\Gamma : p50 \vdash p50}{\Gamma : p11, p24, p34, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50} \otimes \\
\frac{\Gamma : p35 \vdash p35}{\Gamma : p11, p24, p35, p48, p49, p50, p35 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50} \otimes \frac{\Gamma : p36 \vdash p36}{\Gamma : p11, p24, p36, p48, p49, p50, p36 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50} \otimes \\
\frac{\Gamma : p12 \vdash p12}{\Gamma : p12, p24, p36, p48, p49, p50, p12 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50} \otimes \frac{\Gamma : p11, p24, p36, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50}{\Gamma : p12, p24, p36, p48, p49, p50 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50} \otimes \\
\frac{\Gamma : p0 \vdash p0}{\Gamma : p0, p0 \vdash p0} \otimes \frac{\Gamma : \Delta \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50}{\Gamma : p0, p0 \vdash p0 \otimes p49 \otimes p48 \otimes p36 \otimes p24 \otimes p12 \otimes p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50} \otimes \\
\frac{\Gamma : p0 \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50}{\Gamma : \Delta \vdash p11 \otimes p24 \otimes p34 \otimes p48 \otimes p49 \otimes p50} \star
\end{array}$$

file: MCC/FlexibleBarrier_flexbar_04_b_1_1.p (873 ms)

$$\begin{array}{c}
\frac{\Gamma : p1 \vdash p1 \quad \Gamma : p203 \vdash p203}{\Gamma : p1, p203 \vdash p1 \otimes p203} \otimes \\
\frac{\Gamma : p0 \vdash p0 \quad \Gamma : \Delta \vdash p1 \otimes p203}{\Gamma : p0, p0 \vdash p0 \otimes p1 \otimes p203} \star \\
\frac{\Gamma : p0 \vdash p1 \otimes p203}{\Gamma : \Delta \vdash p1 \otimes p203} \star
\end{array}$$

file: MCC/FlexibleBarrier_flexbar_04_b_5_1.p (2722 ms)

$$\begin{array}{c}
\frac{\Gamma : p1 \vdash p1 \quad \Gamma : p255 \vdash p255}{\Gamma : p1, p255 \vdash p1 \otimes p255} \otimes \frac{\Gamma : p266 \vdash p266}{\Gamma : p1, p255, p266 \vdash p1 \otimes p255 \otimes p266} \otimes \\
\frac{\Gamma : p267 \vdash p267}{\Gamma : p1, p255, p267, p267 \vdash p1 \otimes p255 \otimes p266} \otimes \frac{\Gamma : p256 \vdash p256}{\Gamma : p1, p255, p256, p256 \vdash p1 \otimes p255 \otimes p266} \otimes \\
\frac{\Gamma : p204 \vdash p204}{\Gamma : p1, p204, p256, p204 \vdash p1 \otimes p255 \otimes p266} \otimes \frac{\Gamma : p1, p204, p256 \vdash p1 \otimes p255 \otimes p266}{\Gamma : \Delta \vdash p1 \otimes p255 \otimes p266} \star \\
\frac{\Gamma : p203 \vdash p203}{\Gamma : p1, p203, p203 \vdash p1 \otimes p255 \otimes p266} \otimes \frac{\Gamma : p1, p203 \vdash p1 \otimes p255 \otimes p266}{\Gamma : \Delta \vdash p1 \otimes p255 \otimes p266} \star \\
\frac{\Gamma : p0 \vdash p0}{\Gamma : p0, p0 \vdash p0} \otimes \frac{\Gamma : p0 \vdash p1 \otimes p255 \otimes p266}{\Gamma : \Delta \vdash p1 \otimes p255 \otimes p266} \star
\end{array}$$

file: MCC/FlexibleBarrier_flexbar_06_a_1_1.p (14357 ms)

$$\begin{array}{c}
\frac{\Gamma : p12 \vdash p12 \quad \Gamma : p24 \vdash p24}{\Gamma : p12, p24 \vdash p12 \otimes p24} \otimes \frac{\Gamma : p36 \vdash p36}{\Gamma : p12, p24, p36 \vdash p12 \otimes p24 \otimes p36} \otimes \frac{\Gamma : p48 \vdash p48}{\Gamma : p12, p24, p36, p48 \vdash p12 \otimes p24 \otimes p36 \otimes p48} \otimes \frac{\Gamma : p60 \vdash p60}{\Gamma : p12, p24, p36, p48, p60 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60} \otimes \frac{\Gamma : p72 \vdash p72}{\Gamma : p12, p24, p36, p48, p60, p72 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60 \otimes p72} \otimes \frac{\Gamma : p73 \vdash p73}{\Gamma : p12, p24, p36, p48, p60, p72, p73 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60 \otimes p72 \otimes p73} \otimes \frac{\Gamma : p74 \vdash p74}{\Gamma : p12, p24, p36, p48, p60, p72, p73, p74 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60 \otimes p72 \otimes p73 \otimes p74} \otimes \\
\frac{\Gamma : p0 \vdash p0}{\Gamma : p0, p0 \vdash p0} \otimes \frac{\Gamma : \Delta \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60 \otimes p72 \otimes p73 \otimes p74}{\Gamma : p0, p0 \vdash p0 \otimes p74 \otimes p73 \otimes p72 \otimes p60 \otimes p48 \otimes p36 \otimes p24 \otimes p12 \otimes p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60 \otimes p72 \otimes p73 \otimes p74} \otimes \\
\frac{\Gamma : p0 \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60 \otimes p72 \otimes p73 \otimes p74}{\Gamma : \Delta \vdash p12 \otimes p24 \otimes p36 \otimes p48 \otimes p60 \otimes p72 \otimes p73 \otimes p74} \star
\end{array}$$

file: MCC/FlexibleBarrier_flexbar_06_a_5_1.p (33351 ms)

$$\begin{array}{c}
\frac{\Gamma : p1 \vdash p1 \quad \Gamma : p656 \vdash p656}{\Gamma : p1, p656 \vdash p1 \otimes p656} \otimes \quad \frac{\Gamma : p917 \vdash p917}{\Gamma : p1, p656, p917 \vdash p1 \otimes p656 \otimes p917} \otimes \\
\frac{\Gamma : p918 \vdash p918}{\Gamma : p1, p656, p918, p918 \multimap p917 \vdash p1 \otimes p656 \otimes p917} \multimap \quad \frac{\Gamma : p919 \vdash p919}{\Gamma : p1, p656, p919, p919 \multimap p918 \vdash p1 \otimes p656 \otimes p917} \multimap \quad D_C \\
\frac{\Gamma : p908 \vdash p908}{\Gamma : p1, p656, p908, p908 \multimap p919 \vdash p1 \otimes p656 \otimes p917} \multimap \quad D_C \\
\frac{\Gamma : p1, p656, p908 \vdash p1 \otimes p656 \otimes p917}{\Gamma : p1, p656, p908 \vdash p1 \otimes p656 \otimes p917} \star \\
\frac{\Gamma : p655 \vdash p655}{\Gamma : p1, p655, p655 \multimap p908 \vdash p1 \otimes p656 \otimes p917} \multimap \quad D_C \\
\frac{\Gamma : p1, p655 \vdash p1 \otimes p656 \otimes p917}{\Gamma : p1, p655 \vdash p1 \otimes p656 \otimes p917} \star \\
\frac{\Gamma : p0 \vdash p0}{\Gamma : p0, p0 \multimap p655 \vdash p1 \otimes p1 \otimes p656 \otimes p917} \multimap \quad D_C \\
\frac{\Gamma : p0 \vdash p1 \otimes p656 \otimes p917}{\Gamma : \Delta \vdash p1 \otimes p656 \otimes p917} \star
\end{array}$$

file: MCC/FlexibleBarrier_flexbar_10_b_1_1.p (34087 ms)

$$\begin{array}{c}
\frac{\Gamma : p1 \vdash p1 \quad \Gamma : p977 \vdash p977}{\Gamma : p1, p977 \vdash p1 \otimes p977} \otimes \\
\frac{\Gamma : p0 \vdash p0}{\Gamma : \Delta \vdash p1 \otimes p977} \star \\
\frac{\Gamma : p0, p0 \multimap p977 \vdash p1 \otimes p1 \otimes p977}{\Gamma : p0 \vdash p1 \otimes p977} \multimap \quad D_C \\
\frac{\Gamma : p0 \vdash p1 \otimes p977}{\Gamma : \Delta \vdash p1 \otimes p977} \star
\end{array}$$

file: MCC/HouseConstruction-002_10_1.p (10044 ms)

$$\begin{array}{c}
\frac{\Gamma : p12 \vdash p12 \quad \Gamma : p25 \vdash p25}{\Gamma : p12, p25 \vdash p12 \otimes p25} \otimes \quad \frac{\Gamma : p3 \vdash p3}{\Gamma : p12, p25, p3 \vdash p12 \otimes p25 \otimes p3} \otimes \quad \frac{\Gamma : p5 \vdash p5}{\Gamma : p12, p25, p3, p5 \vdash p12 \otimes p25 \otimes p3 \otimes p5} \otimes \quad \frac{\Gamma : p8 \vdash p8}{\Gamma : p12, p25, p3, p5, p8 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8} \otimes \\
\frac{\Gamma : p16 \vdash p16}{\Gamma : p12, p16, p3, p5, p8, p16 \multimap p25 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8} \multimap \quad D_C \\
\frac{\Gamma : p4 \vdash p4 \quad \Gamma : p15 \vdash p15}{\Gamma : p15, p4 \vdash p4 \otimes p15} \otimes \quad \frac{\Gamma : p12, p15, p3, p4, p5, p8, p4 \vdash p15 \multimap p16 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8}{\Gamma : p12, p15, p3, p4, p5, p8 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8} \multimap \quad D_C \\
\frac{\Gamma : p11 \vdash p11}{\Gamma : p11, p12, p3, p4, p5, p8, p11 \multimap p15 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8} \multimap \quad D_C \\
\frac{\Gamma : p7 \vdash p7}{\Gamma : p12, p3, p4, p5, p7, p8 \multimap p11 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8} \multimap \quad D_C \\
\frac{\Gamma : p12, p3, p4, p5, p7, p8 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8}{\Gamma : \Delta \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8} \star \\
\frac{\Gamma : p6 \vdash p6}{\Gamma : p3, p4, p5, p6, p6 \multimap p7 \vdash p12 \otimes p8 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8} \multimap \quad D_C \\
\frac{\Gamma : p3 \vdash p3}{\Gamma : p3, p4, p5, p6 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8} \star \\
\frac{\Gamma : p2 \vdash p2}{\Gamma : p3, p3 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8} \multimap \quad D_C \\
\frac{\Gamma : p2 \vdash p2}{\Gamma : p2, p3, p2 \multimap p3 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8} \multimap \quad D_C \\
\frac{\Gamma : p1 \vdash p1}{\Gamma : p1, p2, p1 \multimap p2 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8} \multimap \quad D_C \\
\frac{\Gamma : p1, p1 \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8}{\Gamma : \Delta \vdash p12 \otimes p25 \otimes p3 \otimes p5 \otimes p8} \star
\end{array}$$

file: MCC/HouseConstruction-002_1_1.p (58 ms)

$$\begin{array}{c}
\frac{\Gamma : p1 \vdash p1 \quad \Gamma : p2 \vdash p2}{\Gamma : p1, p2 \vdash p1 \otimes p2} \otimes \\
\frac{\Gamma : p1, p1, p1 \multimap p2 \vdash p1 \otimes p2}{\Gamma : p1, p1 \vdash p1 \otimes p2} \multimap \quad D_C \\
\frac{\Gamma : p1, p1 \vdash p1 \otimes p2}{\Gamma : \Delta \vdash p1 \otimes p2} \star
\end{array}$$

file: MCC/HouseConstruction-002_5_1.p (210 ms)

$$\begin{array}{c}
\frac{\frac{\frac{\frac{\frac{\Gamma : p3 \vdash p3}{\Gamma : p3, p4 \vdash p3 \otimes p4} \otimes \frac{\Gamma : p4 \vdash p4}{\Gamma : p5 \vdash p5} \otimes \frac{\Gamma : p5 \vdash p5}{\Gamma : p6 \vdash p6} \otimes \frac{\Gamma : p3, p4, p5 \vdash p3 \otimes p4 \otimes p5}{\Gamma : p3, p4, p5, p6 \vdash p3 \otimes p4 \otimes p5 \otimes p6} \star}{\Gamma : \Delta \vdash p3 \otimes p4 \otimes p5 \otimes p6} \neg}{\Gamma : p3 \vdash p3} \neg}{\Gamma : p2 \vdash p2} \neg}{\Gamma : p2, p3, p2 \neg p3 \vdash p3 \otimes p4 \otimes p5 \otimes p6} D_C \neg}{\Gamma : p2, p3 \vdash p3 \otimes p4 \otimes p5 \otimes p6} D_C \neg}{\Gamma : p2, p2, p2 \neg p3 \vdash p3 \otimes p4 \otimes p5 \otimes p6} D_C \neg}{\Gamma : p2, p2 \vdash p3 \otimes p4 \otimes p5 \otimes p6} D_C \neg}{\Gamma : p1 \vdash p1} \neg}{\Gamma : p1, p2, p1 \neg p2 \vdash p3 \otimes p4 \otimes p5 \otimes p6} D_C \neg}{\Gamma : p1, p1 \vdash p3 \otimes p4 \otimes p5 \otimes p6} D_C \neg}{\Gamma : \Delta \vdash p3 \otimes p4 \otimes p5 \otimes p6} \star
\end{array}$$

file: MCC/HouseConstruction-005_1_1.p (126 ms)

$$\begin{array}{c}
\frac{\frac{\frac{\frac{\Gamma : p1 \vdash p1}{\Gamma : p1, p1 \vdash p1 \otimes p1} \otimes \frac{\Gamma : p1 \vdash p1}{\Gamma : p1, p1 \vdash p1 \otimes p1} \otimes \frac{\Gamma : p1 \vdash p1}{\Gamma : p1, p1 \vdash p1 \otimes p1} \otimes \frac{\Gamma : p1 \vdash p1}{\Gamma : p2 \vdash p2} \otimes \frac{\Gamma : p1, p1, p1, p1 \vdash p1 \otimes p1 \otimes p1 \otimes p1 \otimes p2}{\Gamma : p1, p1, p1, p1, p2 \vdash p1 \otimes p1 \otimes p1 \otimes p1 \otimes p2} \neg}{\Gamma : p1, p1, p1, p1, p1 \neg p2 \vdash p1 \otimes p1 \otimes p1 \otimes p1 \otimes p2} D_C \neg}{\Gamma : p1, p1, p1, p1, p1 \vdash p1 \otimes p1 \otimes p1 \otimes p1 \otimes p2} \star}{\Gamma : \Delta \vdash p1 \otimes p1 \otimes p1 \otimes p1 \otimes p2} \star
\end{array}$$

file: MCC/HouseConstruction-005_5_1.p (266 ms)

$$\begin{array}{c}
\frac{\frac{\frac{\frac{\frac{\Gamma : p1 \vdash p1}{\Gamma : p1, p1 \vdash p1 \otimes p1} \otimes \frac{\Gamma : p1 \vdash p1}{\Gamma : p2 \vdash p2} \otimes \frac{\Gamma : p1, p1, p2 \vdash p1 \otimes p1 \otimes p2}{\Gamma : p1, p1, p2, p3 \vdash p1 \otimes p1 \otimes p2 \otimes p3} \otimes \frac{\Gamma : p3 \vdash p3}{\Gamma : p3 \vdash p3} \otimes \frac{\Gamma : p1, p1, p2, p3, p2 \neg p3 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3}{\Gamma : p1, p1, p2, p3, p3 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} \neg}{\Gamma : p1, p1, p2, p2, p3 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} D_C \neg}{\Gamma : p1, p1, p2, p2, p2 \neg p3 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} D_C \neg}{\Gamma : p1, p1, p2, p2, p2 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} D_C \neg}{\Gamma : p1, p1, p1, p2, p2 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} D_C \neg}{\Gamma : p1, p1, p1, p1, p2 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} D_C \neg}{\Gamma : p1, p1, p1, p1, p1 \neg p2 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} D_C \neg}{\Gamma : p1, p1, p1, p1, p1 \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} \star}{\Gamma : \Delta \vdash p1 \otimes p1 \otimes p2 \otimes p3 \otimes p3} \star
\end{array}$$

file: MCC/HouseConstruction-010_1_1.p (1583 ms)

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

```
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)
```

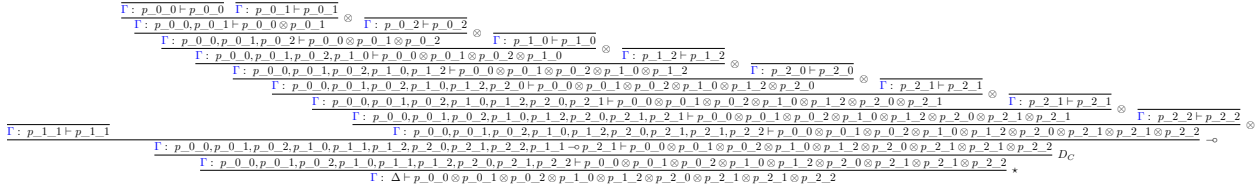
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file: MCC/IBM5964_1_1.p (73502 ms)
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```
file: MCC/IBM703_10_1.p (2283 ms)
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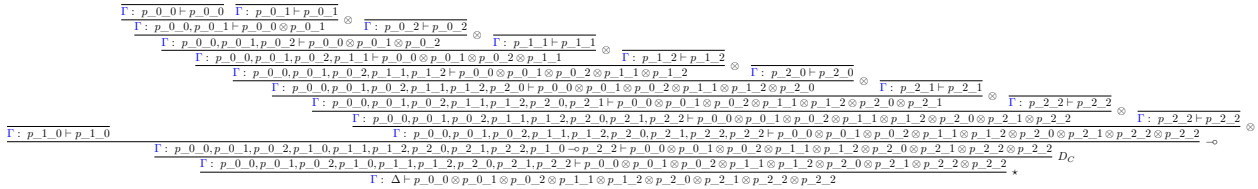
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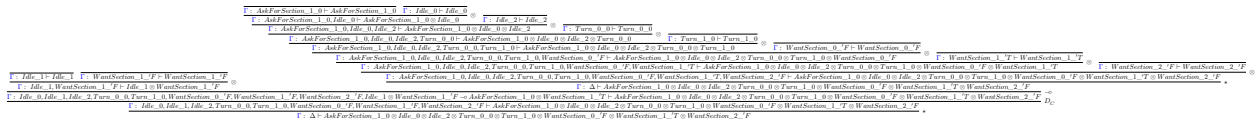
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file: MCC/NeighborGrid_z_2d_3n_1m_t_1_2_1_1.p (28427 ms)



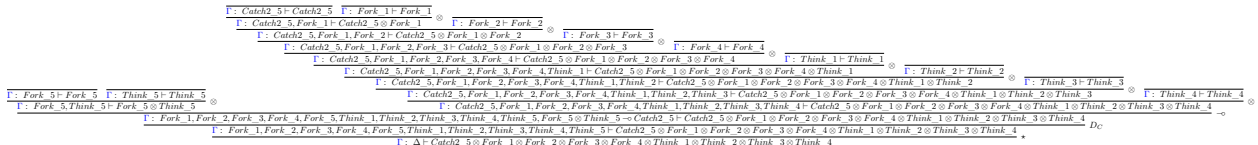
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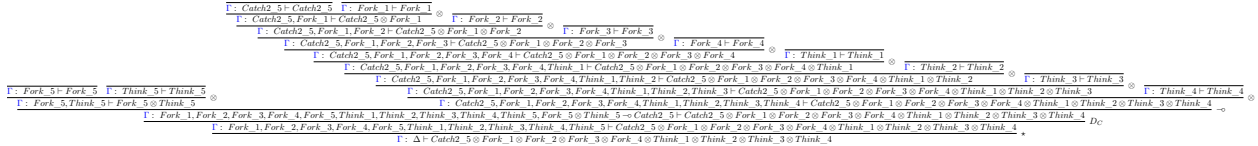
file: MCC/Peterson-2_5_1.p (17659 ms)



file: MCC/Philosophers-5_100_1.p (30876 ms)



file: MCC/Philosophers-5_10_1.p (29996 ms)



file: MCC/Philosophers-5_1_1.p (29759 ms)

file: MCC/Philosophers-5_20_1.p (7357 ms)

file: MCC/Philosophers-5_50_1.p (7442 ms)

file: MCC/Philosophers-5_5_1.p (7699 ms)

file: MCC/PhilosophersDyn_philo_dyn-3-unfolded_10_1.p (59985 ms)

file: 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)

$$\frac{\Gamma : p0 \vdash p0}{\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} \multimap \frac{\Gamma : p0 \vdash p0}{\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} \multimap \frac{\Gamma : p15 \vdash p15 \quad \Gamma : p5 \vdash p5}{\Gamma : p15, p5 \vdash p15 \otimes p5} \otimes \frac{\Gamma : p10, p15, p20, p21, p27, p5, p15 \otimes p5 \multimap p3 \vdash p15 \otimes p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma : p10, p15, p20, p21, p27, p5 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} D_C \star \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 \frac{\Gamma : p10, p15, p20, p21, p27, p3, p20 \otimes p10 \multimap p9 \otimes p20 \otimes p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma : p10, p15, p20, p21, p27, p3 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} D_C \multimap \frac{\Gamma : p10, 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} \star \frac{\Gamma : p15, p20, p21, p27, p3 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3}{\Gamma : p15, p20, p21, p27 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3} \otimes \frac{\Gamma : p3 \vdash p3}{\Gamma : p3 \vdash p3} \otimes \frac{\Gamma : p9 \vdash p9}{\Gamma : p9 \vdash p9} \otimes \frac{\Gamma : p15, p20, p21, p27, p3 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3}{\Gamma : p15, p20, p21 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3} \otimes \frac{\Gamma : p27 \vdash p27}{\Gamma : p27 \vdash p27} \otimes \frac{\Gamma : p21 \vdash p21}{\Gamma : p15, p20, p21 \vdash p15 \otimes p20 \otimes p21} \otimes \frac{\Gamma : p20 \vdash p15}{\Gamma : p15 \vdash p15}$$

file: MCC/Raft_raft_02_5_1.p (1160 ms)

$$\begin{array}{c}
\frac{\Gamma : p15 \vdash p15 \quad \Gamma : p20 \vdash p20}{\Gamma : p15, p20 \vdash p15 \otimes p20} \otimes \frac{\Gamma : p21 \vdash p21}{\Gamma : p15, p20, p21 \vdash p15 \otimes p20 \otimes p21} \otimes \frac{\Gamma : p27 \vdash p27}{\Gamma : p15, p20, p21, p27 \vdash p15 \otimes p20 \otimes p21 \otimes p27} \otimes \frac{\Gamma : p3 \vdash p3}{\Gamma : p15, p20, p21, p27, p3 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3} \otimes \frac{\Gamma : p9 \vdash p9}{\Gamma : p10, p20 \vdash p20 \otimes p10} \otimes \\
\frac{\Gamma : p20 \vdash p20 \quad \Gamma : p10 \vdash p10}{\Gamma : p10, p20 \vdash p20 \otimes p10} \otimes \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 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \multimap D_C \\
\frac{\Gamma : p15 \vdash p15 \quad \Gamma : p5 \vdash p5}{\Gamma : p15, p5 \vdash p15 \otimes p5} \otimes \frac{\Gamma : \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma : p10, p15, p20, p21, p27, p5 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \multimap \\
\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}{\Gamma : p10, p15, p20, p21, p27, p5 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9} \multimap D_C \\
\frac{\Gamma : \Delta \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9}{\Gamma : p0 \vdash 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} \multimap D_C \\
\frac{\Gamma : p0 \vdash p15 \otimes p20 \otimes p21 \otimes p27 \otimes p3 \otimes p9 \quad \Gamma : \Delta \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} \star
\end{array}$$

file: MCC/ResAllocation_RAS-C-3_100_1.p (1804 ms)

[illegible]

file: MCC/ResAllocation_RAS-C-3_10_1.p (1661 ms)

The diagram illustrates the decomposition of a polynomial P into a sum of squares (SOS) of other polynomials. The process is shown in several layers, with each layer representing a different level of the decomposition. The top layer shows P as a sum of squares of polynomials Q_1, Q_2, Q_3 . Subsequent layers show these Q polynomials being further decomposed into sums of squares of smaller polynomials, with some terms being grouped together. The bottom layer shows the final decomposition of P into a sum of squares of polynomials R_1, R_2, R_3 . The diagram uses various mathematical symbols, including polynomials, sums, and products, to represent the relationships between the different levels of the decomposition.

file: MCC/ResAllocation_RAS-C-3_1_1.p (5894 ms)

[illegible]

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file: 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)

```
file: MCC/ResAllocation_RAS-R-2_100_1.p (92 ms)
```

$$\frac{\frac{\frac{\Gamma : r_0_1 \vdash r_0_1}{\Gamma : r_0_1, r_1_1 \vdash r_0_1 \otimes r_1_1} \quad \frac{\frac{\Gamma : r_1_1 \vdash r_1_1}{\Gamma : p_1_1, r_0_0 \vdash p_1_1 \otimes r_0_0} \quad \frac{\Gamma : r_0_0 \vdash r_0_0}{\Gamma : p_1_1, r_0_0, r_1_0 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0} \otimes \frac{\Gamma : r_1_0 \vdash r_1_0}{\Gamma : p_1_1, r_0_0, r_1_0 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0} \otimes \frac{\Gamma : p_1_1, r_0_0, r_1_0 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}{\Gamma : r_0_0, r_0_1, r_1_0, r_1_1, r_0_1 \otimes r_1_1 \multimap p_1_1 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0} \multimap \frac{\Gamma : r_0_0, r_0_1, r_1_0, r_1_1 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}{\Gamma : \Delta \vdash p_1_1 \otimes r_0_0 \otimes r_1_0} \star}{\Gamma : p_1_1 \vdash p_1_1} \otimes \frac{\Gamma : r_0_0 \vdash r_0_0}{\Gamma : p_1_1, r_0_0 \vdash p_1_1 \otimes r_0_0} \otimes \frac{\Gamma : p_1_1, r_0_0 \vdash p_1_1 \otimes r_0_0}{\Gamma : p_1_1, r_0_0, r_1_0 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0} \otimes \frac{\Gamma : r_1_0 \vdash r_1_0}{\Gamma : p_1_1, r_0_0, r_1_0 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0} \otimes \frac{\Gamma : p_1_1, r_0_0, r_1_0 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}{\Gamma : r_0_0, r_0_1, r_1_0, r_1_1, r_0_1 \otimes r_1_1 \multimap p_1_1 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0} \multimap \frac{\Gamma : r_0_0, r_0_1, r_1_0, r_1_1 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}{\Gamma : \Delta \vdash p_1_1 \otimes r_0_0 \otimes r_1_0} \star \quad D_C$$

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

$$\frac{\frac{\frac{\overline{\Gamma: r_0_1 \vdash r_0_1} \quad \overline{\Gamma: r_1_1 \vdash r_1_1}}{\overline{\Gamma: r_0_1, r_1_1 \vdash r_0_1 \otimes r_1_1}} \otimes \frac{\frac{\overline{\Gamma: p_1_1 \vdash p_1_1} \quad \overline{\Gamma: r_0_0 \vdash r_0_0}}{\overline{\Gamma: p_1_1, r_0_0 \vdash p_1_1 \otimes r_0_0}} \otimes \overline{\Gamma: r_1_0 \vdash r_1_0}}{\overline{\Gamma: p_1_1, r_0_0, r_1_0 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}} \otimes \frac{\overline{\Gamma: r_0_0, r_0_1, r_1_0, r_1_1, r_0_1 \otimes r_1_1 \multimap p_1_1 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}}{\overline{\Gamma: r_0_0, r_0_1, r_1_0, r_1_1 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}} \multimap}{\overline{\Gamma: \Delta \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}} \star D_C$$

```
file: MCC/ResAllocation_RAS-R-2_1_1.p (79 ms)
```

$$\frac{\frac{\frac{\overline{\Gamma: r_0_1 \vdash r_0_1} \quad \overline{\Gamma: r_1_1 \vdash r_1_1}}{\overline{\Gamma: r_0_1, r_1_1 \vdash r_0_1 \otimes r_1_1}} \otimes \frac{\frac{\overline{\Gamma: p_1_1 \vdash p_1_1} \quad \overline{\Gamma: r_0_0 \vdash r_0_0}}{\overline{\Gamma: p_1_1, r_0_0 \vdash p_1_1 \otimes r_0_0}} \otimes \overline{\Gamma: r_1_0 \vdash r_1_0}}{\overline{\Gamma: p_1_1, r_0_0, r_1_0 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}} \otimes \frac{\overline{\Gamma: r_0_0, r_0_1, r_1_0, r_1_1, r_0_1 \otimes r_1_1 \multimap p_1_1 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}}{\overline{\Gamma: r_0_0, r_0_1, r_1_0, r_1_1 \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}} \multimap \frac{\overline{\Gamma: \Delta \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}}{\overline{\Gamma: \Delta \vdash p_1_1 \otimes r_0_0 \otimes r_1_0}} \star D_C$$

```
file: MCC/ResAllocation_RAS-R-2_20_1.p (132 ms)
```

$$\frac{\frac{\frac{\frac{\frac{\Gamma: r_0, 0 \vdash r_0, 0}{\Gamma: r_0, 0, r_1 \vdash r_0, 0 \otimes r_1, 0}}{\Gamma: r_0, 1 \vdash r_1, 0}}{\Gamma: p_1 \vdash p_1, 1}}{\Gamma: p_1, 1, r_0, 0, r_1 \vdash r_0, 0 \otimes r_1, 0 \otimes p_1, 1}} \otimes \frac{\frac{\frac{\frac{\Gamma: p_1, 0 \vdash p_1, 0}{\Gamma: p_1, 0, r_0, 1 \vdash p_1, 0 \otimes r_0, 1}}{\Gamma: r_1 \vdash r_1, 1}}{\Gamma: p_1, 0, r_0, 1, r_1 \vdash p_1, 0 \otimes r_0, 1 \otimes r_1, 1}} \otimes \frac{\frac{\frac{\Gamma: \Delta \vdash p_1, 0 \otimes r_0, 1 \otimes r_1, 1}{\Gamma: p_1, 1, r_0, 0, r_1 \vdash r_0, 0 \otimes p_1, 1 \vdash r_0, 0, 1 \otimes p_1, 1 \vdash p_1, 0 \otimes r_0, 1 \otimes r_1, 1}}{\Gamma: p_1, 1, r_0, 0, r_1 \vdash p_1, 0 \otimes r_0, 1 \otimes r_1, 1}} \circ \frac{\frac{\frac{\frac{\Gamma: r_0, 0, 1, r_1 \vdash r_0, 1 \otimes r_1, 1}{\Gamma: r_0, 0, 1, r_1 \vdash r_0, 1 \otimes r_1, 1}}{\Gamma: r_0, 0, 1, r_1, 0, r_1 \vdash r_0, 1 \otimes r_1, 1 \otimes p_1, 1 \otimes r_0, 1 \otimes r_1, 1}}{\Gamma: r_0, 0, 0, 1, r_1 \vdash p_1, 0 \otimes r_0, 1 \otimes r_1, 1}} \circ \frac{\frac{\frac{\Gamma: \Delta \vdash p_1, 0 \otimes r_0, 1 \otimes r_1, 1}{\Gamma: \Delta \vdash p_1, 0 \otimes r_0, 1 \otimes r_1, 1}}{\Gamma: \Delta \vdash p_1, 0 \otimes r_0, 1 \otimes r_1, 1}}{\Gamma: \Delta \vdash p_1, 0 \otimes r_0, 1 \otimes r_1, 1}} \star D_C$$

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

```
file: MCC/ResAllocation_RAS-R-3_50_1.p (219 ms)
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file: MCC/ResAllocation_RAS-R-3_5_1.p (180 ms)

```
file: MCC/ResAllocation_RAS-R-5_100_1.p (7489 ms)
```

```
file: MCC/ResAllocation_RAS-R-5_10_1.p (7495 ms)
```

```
file: MCC/ResAllocation_RAS-R-5_1_1.p (25745 ms)
```

file: MCC/ResAllocation_RAS-R-5_20_1.p (4288 ms)

```
file: 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: MCC/RobotManipulation_robot-manipulation-1_10_1.p (426 ms)

file: MCC/RobotManipulation_robot-manipulation-1_1_1.p (2206 ms)

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)
```

file: MCC/RobotManipulation_robot-manipulation-2_100_1.p (95949 ms)

file: MCC/RobotManipulation_robot-manipulation-2_10_1.p (94414 ms)

```
file: MCC/SimpleLoadBal_simple_lbs-2_100_1.p (70864 ms)
```

```
file: MCC/SimpleLoadBal_simple_lbs-2_10_1.p (70801 ms)
```

```
file: MCC/SimpleLoadBal_simple_lbs-2_1_1.p (9358 ms)
```

```
file: MCC/SimpleLoadBal_simple_lbs-2_50_1.p (2881 ms)
```

```
file: MCC/TCPcondis_tcp5_1_1.p (21504 ms)
```

```
file: MCC/TokenRing-5-unfolded_1_1.p (1749 ms)
```

```
file: MCC/UtahNoC_1_1.p (75438 ms)
```