

Reduzierte verschränkte semiotische Systemrelationen

1. Systemrelationen und konverse Systemrelationen wurden in Toth (2025a, b) in die Semiotik eingeführt. Zu Umgebungsredukten in Situationsklassen vgl. Toth (2025c). Im folgenden werden reduzierte verschränkte semiotische Systemrelationen bifunktoriell (vgl. Schubert 1970, S. 9 ff.) komponiert.

2. Verschränkte semiotische Systemrelationen

$$\begin{array}{l} 3.1_I \ 2.1_A \ 1.1_R \quad \times \quad 1.1_R \ 1.2_R \ 1.3_R \\ (3.2_{I,A}, 1.1_{I,A} \mid 2.1_{A,R}, 1.1_{A,R}) \quad \times \quad (1.1_{R,A}, 1.2_{R,A} \mid 1.1_{A,I}, 2.3_{A,I}) \\ (3.1_{I,A,R}, 2.1_{I,A,R}) \quad \quad \quad (1.2_{I,A,R}, 1.3_{I,A,R}) \end{array}$$

$$\begin{array}{l} 3.1_I \ 2.1_A \ 1.2_R \quad \times \quad 2.1_A \ 1.2_R \ 1.3_R \\ (3.2_{I,A}, 1.1_{I,A} \mid 2.1_{A,R}, 1.2_{A,R}) \quad \times \quad (2.1_{R,A}, 1.2_{R,A} \mid 1.1_{A,I}, 2.3_{A,I}) \\ (3.1_{I,A,R}, 2.2_{I,A,R}) \quad \quad \quad (2.2_{I,A,R}, 1.3_{I,A,R}) \end{array}$$

$$\begin{array}{l} 3.1_I \ 2.1_A \ 1.3_R \quad \times \quad 3.1_I \ 1.2_R \ 1.3_R \\ (3.2_{I,A}, 1.1_{I,A} \mid 2.1_{A,R}, 1.3_{A,R}) \quad \times \quad (3.1_{R,A}, 1.2_{R,A} \mid 1.1_{A,I}, 2.3_{A,I}) \\ (3.1_{I,A,R}, 2.3_{I,A,R}) \quad \quad \quad (3.2_{I,A,R}, 1.3_{I,A,R}) \end{array}$$

$$\begin{array}{l} 3.1_I \ 2.2_A \ 1.1_R \quad \times \quad 1.1_R \ 2.2_A \ 1.3_R \\ (3.2_{I,A}, 1.2_{I,A} \mid 2.1_{A,R}, 2.1_{A,R}) \quad \times \quad (1.2_{R,A}, 1.2_{R,A} \mid 2.1_{A,I}, 2.3_{A,I}) \\ (3.2_{I,A,R}, 2.1_{I,A,R}) \quad \quad \quad (1.2_{I,A,R}, 2.3_{I,A,R}) \end{array}$$

$$\begin{array}{l} 3.1_I \ 2.2_A \ 1.2_R \quad \times \quad 2.1_A \ 2.2_A \ 1.3_R \\ (3.2_{I,A}, 1.2_{I,A} \mid 2.1_{A,R}, 2.2_{A,R}) \quad \times \quad (2.2_{R,A}, 1.2_{R,A} \mid 2.1_{A,I}, 2.3_{A,I}) \\ (3.2_{I,A,R}, 2.2_{I,A,R}) \quad \quad \quad (2.2_{I,A,R}, 2.3_{I,A,R}) \end{array}$$

$$3.1_I \ 2.2_A \ 1.3_R \quad \times \quad 3.1_I \ 2.2_A \ 1.3_R$$

$$\begin{array}{lcl}
(3.2_{I,A}, 1.2_{I,A} \mid 2.1_{A,R}, 2.3_{A,R}) & \times & (3.2_{R,A}, 1.2_{R,A} \mid 2.1_{A,I}, 2.3_{A,I}) \\
(3.2_{I,A,R}, 2.3_{I,A,R}) & & (3.2_{I,A,R}, 2.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.1_I \ 2.3_A \ 1.1_R & \times & 1.1_R \ 3.2_I \ 1.3_R \\
(3.2_{I,A}, 1.3_{I,A} \mid 2.1_{A,R}, 3.1_{A,R}) & \times & (1.3_{R,A}, 1.2_{R,A} \mid 3.1_{A,I}, 2.3_{A,I}) \\
(3.3_{I,A,R}, 2.1_{I,A,R}) & & (1.2_{I,A,R}, 3.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.1_I \ 2.3_A \ 1.2_R & \times & 2.1_A \ 3.2_I \ 1.3_R \\
(3.2_{I,A}, 1.3_{I,A} \mid 2.1_{A,R}, 3.2_{A,R}) & \times & (2.3_{R,A}, 1.2_{R,A} \mid 3.1_{A,I}, 2.3_{A,I}) \\
(3.3_{I,A,R}, 2.2_{I,A,R}) & & (2.2_{I,A,R}, 3.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.1_I \ 2.3_A \ 1.3_R & \times & 3.1_I \ 3.2_I \ 1.3_R \\
(3.2_{I,A}, 1.3_{I,A} \mid 2.1_{A,R}, 3.3_{A,R}) & \times & (3.3_{R,A}, 1.2_{R,A} \mid 3.1_{A,I}, 2.3_{A,I}) \\
(3.3_{I,A,R}, 2.3_{I,A,R}) & & (3.2_{I,A,R}, 3.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.1_A \ 1.1_R & \times & 1.1_R \ 1.2_R \ 2.3_A \\
(3.2_{I,A}, 2.1_{I,A} \mid 2.1_{A,R}, 1.1_{A,R}) & \times & (1.1_{R,A}, 1.2_{R,A} \mid 1.2_{A,I}, 2.3_{A,I}) \\
(3.1_{I,A,R}, 2.1_{I,A,R}) & & (1.2_{I,A,R}, 1.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.1_A \ 1.2_R & \times & 2.1_A \ 1.2_R \ 2.3_A \\
(3.2_{I,A}, 2.1_{I,A} \mid 2.1_{A,R}, 1.2_{A,R}) & \times & (2.1_{R,A}, 1.2_{R,A} \mid 1.2_{A,I}, 2.3_{A,I}) \\
(3.1_{I,A,R}, 2.2_{I,A,R}) & & (2.2_{I,A,R}, 1.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.1_A \ 1.3_R & \times & 3.1_I \ 1.2_R \ 2.3_A \\
(3.2_{I,A}, 2.1_{I,A} \mid 2.1_{A,R}, 1.3_{A,R}) & \times & (3.1_{R,A}, 1.2_{R,A} \mid 1.2_{A,I}, 2.3_{A,I}) \\
(3.1_{I,A,R}, 2.3_{I,A,R}) & & (3.2_{I,A,R}, 1.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.2_A \ 1.1_R & \times & 1.1_R \ 2.2_A \ 2.3_A \\
(3.2_{I,A}, 2.2_{I,A} \mid 2.1_{A,R}, 2.1_{A,R}) & \times & (1.2_{R,A}, 1.2_{R,A} \mid 2.2_{A,I}, 2.3_{A,I}) \\
(3.2_{I,A,R}, 2.1_{I,A,R}) & & (1.2_{I,A,R}, 2.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.2_A \ 1.2_R & \times & 2.1_A \ 2.2_A \ 2.3_A \\
(3.2_{I,A}, 2.2_{I,A} \mid 2.1_{A,R}, 2.2_{A,R}) & \times & (2.2_{R,A}, 1.2_{R,A} \mid 2.2_{A,I}, 2.3_{A,I}) \\
(3.2_{I,A,R}, 2.2_{I,A,R}) & & (2.2_{I,A,R}, 2.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.2_A \ 1.3_R & \times & 3.1_I \ 2.2_A \ 2.3_A \\
(3.2_{I,A}, 2.2_{I,A} \mid 2.1_{A,R}, 2.3_{A,R}) & \times & (3.2_{R,A}, 1.2_{R,A} \mid 2.2_{A,I}, 2.3_{A,I}) \\
(3.2_{I,A,R}, 2.3_{I,A,R}) & & (3.2_{I,A,R}, 2.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.3_A \ 1.1_R & \times & 1.1_R \ 3.2_I \ 2.3_A \\
(3.2_{I,A}, 2.3_{I,A} \mid 2.1_{A,R}, 3.1_{A,R}) & \times & (1.3_{R,A}, 1.2_{R,A} \mid 3.2_{A,I}, 2.3_{A,I}) \\
(3.3_{I,A,R}, 2.1_{I,A,R}) & & (1.2_{I,A,R}, 3.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.3_A \ 1.2_R & \times & 2.1_A \ 3.2_I \ 2.3_A \\
(3.2_{I,A}, 2.3_{I,A} \mid 2.1_{A,R}, 3.2_{A,R}) & \times & (2.3_{R,A}, 1.2_{R,A} \mid 3.2_{A,I}, 2.3_{A,I}) \\
(3.3_{I,A,R}, 2.2_{I,A,R}) & & (2.2_{I,A,R}, 3.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.3_A \ 1.3_R & \times & 3.1_I \ 3.2_I \ 2.3_A \\
(3.2_{I,A}, 2.3_{I,A} \mid 2.1_{A,R}, 3.3_{A,R}) & \times & (3.3_{R,A}, 1.2_{R,A} \mid 3.2_{A,I}, 2.3_{A,I}) \\
(3.3_{I,A,R}, 2.3_{I,A,R}) & & (3.2_{I,A,R}, 3.3_{I,A,R})
\end{array}$$

$$\begin{array}{lcl}
3.3_I \ 2.1_A \ 1.1_R & \times & 1.1_R \ 1.2_R \ 3.3_I \\
(3.2_{I,A}, 3.1_{I,A} \mid 2.1_{A,R}, 1.1_{A,R}) & \times & (1.1_{R,A}, 1.2_{R,A} \mid 1.3_{A,I}, 2.3_{A,I}) \\
(3.1_{I,A,R}, 2.1_{I,A,R}) & & (1.2_{I,A,R}, 1.3_{I,A,R})
\end{array}$$

$$\begin{array}{l}
3.3_I \ 2.1_A \ 1.2_R \quad \times \quad 2.1_A \ 1.2_R \ 3.3_I \\
(3.2_{I,A}, 3.1_{I,A} \mid 2.1_{A,R}, 1.2_{A,R}) \times (2.1_{R,A}, 1.2_{R,A} \mid 1.3_{A,I}, 2.3_{A,I}) \\
(3.1_{I,A,R}, 2.2_{I,A,R}) \quad (2.2_{I,A,R}, 1.3_{I,A,R})
\end{array}$$

$$\begin{array}{l}
3.3_I \ 2.1_A \ 1.3_R \quad \times \quad 3.1_I \ 1.2_R \ 3.3_I \\
(3.2_{I,A}, 3.1_{I,A} \mid 2.1_{A,R}, 1.3_{A,R}) \times (3.1_{R,A}, 1.2_{R,A} \mid 1.3_{A,I}, 2.3_{A,I}) \\
(3.1_{I,A,R}, 2.3_{I,A,R}) \quad (3.2_{I,A,R}, 1.3_{I,A,R})
\end{array}$$

$$\begin{array}{l}
3.3_I \ 2.2_A \ 1.1_R \quad \times \quad 1.1_R \ 2.2_A \ 3.3_I \\
(3.2_{I,A}, 3.2_{I,A} \mid 2.1_{A,R}, 2.1_{A,R}) \times (1.2_{R,A}, 1.2_{R,A} \mid 2.3_{A,I}, 2.3_{A,I}) \\
(3.2_{I,A,R}, 2.1_{I,A,R}) \quad (1.2_{I,A,R}, 2.3_{I,A,R})
\end{array}$$

$$\begin{array}{l}
3.3_I \ 2.2_A \ 1.2_R \quad \times \quad 2.1_A \ 2.2_A \ 3.3_I \\
(3.2_{I,A}, 3.2_{I,A} \mid 2.1_{A,R}, 2.2_{A,R}) \times (2.2_{R,A}, 1.2_{R,A} \mid 2.3_{A,I}, 2.3_{A,I}) \\
(3.2_{I,A,R}, 2.2_{I,A,R}) \quad (2.2_{I,A,R}, 2.3_{I,A,R})
\end{array}$$

$$\begin{array}{l}
3.3_I \ 2.2_A \ 1.3_R \quad \times \quad 3.1_I \ 2.2_A \ 3.3_I \\
(3.2_{I,A}, 3.2_{I,A} \mid 2.1_{A,R}, 2.3_{A,R}) \times (3.2_{R,A}, 1.2_{R,A} \mid 2.3_{A,I}, 2.3_{A,I}) \\
(3.2_{I,A,R}, 2.3_{I,A,R}) \quad (3.2_{I,A,R}, 2.3_{I,A,R})
\end{array}$$

$$\begin{array}{l}
3.3_I \ 2.3_A \ 1.1_R \quad \times \quad 1.1_R \ 3.2_I \ 3.3_I \\
(3.2_{I,A}, 3.3_{I,A} \mid 2.1_{A,R}, 3.1_{A,R}) \times (1.3_{R,A}, 1.2_{R,A} \mid 3.3_{A,I}, 2.3_{A,I}) \\
(3.3_{I,A,R}, 2.1_{I,A,R}) \quad (1.2_{I,A,R}, 3.3_{I,A,R})
\end{array}$$

$$\begin{array}{l}
3.3_I \ 2.3_A \ 1.2_R \quad \times \quad 2.1_A \ 3.2_I \ 3.3_I \\
(3.2_{I,A}, 3.3_{I,A} \mid 2.1_{A,R}, 3.2_{A,R}) \times (2.3_{R,A}, 1.2_{R,A} \mid 3.3_{A,I}, 2.3_{A,I}) \\
(3.3_{I,A,R}, 2.2_{I,A,R}) \quad (2.2_{I,A,R}, 3.3_{I,A,R})
\end{array}$$

$$\begin{array}{l}
3.3_I \ 2.3_A \ 1.3_R \quad \times \quad 3.1_I \ 3.2_I \ 3.3_I \\
(3.2_{I,A}, 3.3_{I,A} \mid 2.1_{A,R}, 3.3_{A,R}) \quad \times \quad (3.3_{R,A}, 1.2_{R,A} \mid 3.3_{A,I}, 2.3_{A,I}) \\
(3.3_{I,A,R}, 2.3_{I,A,R}) \quad (3.2_{I,A,R}, 3.3_{I,A,R})
\end{array}$$

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11.1.2026