

Reduzierte verschränkte semiotische konverse 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 konverse Systemrelationen

$$I_{3.1} \quad A_{2.1} \quad R_{1.1} \quad \times \quad R_{1.1} \quad R_{1.2} \quad R_{1.3}$$

$$(IA_{3.2}, IA_{1.1} \mid AR_{2.1}, AR_{1.1}) \quad \times \quad (RA_{1.1}, RA_{1.2} \mid AI_{1.1}, AI_{2.3})$$

$$(IA_{3.2,1.1}, AR_{3.2,1.1}) \quad (RA_{1.1,2.3}, AI_{1.1,2.3})$$

$$3.1_I \quad 2.1_A \quad 1.2_R \quad \times \quad 2.1_A \quad 1.2_R \quad 1.3_R$$

$$(IA_{3.2}, IA_{1.1} \mid AR_{2.1}, AR_{1.2}) \quad \times \quad (RA_{2.1}, RA_{1.2} \mid AI_{1.1}, AI_{2.3})$$

$$(IA_{3.2,1.2}, AR_{3.2,1.2}) \quad (RA_{2.1,2.3}, AI_{2.1,2.3})$$

$$3.1_I \quad 2.1_A \quad 1.3_R \quad \times \quad 3.1_I \quad 1.2_R \quad 1.3_R$$

$$(IA_{3.2}, IA_{1.1} \mid AR_{2.1}, AR_{1.3}) \quad \times \quad (RA_{3.1}, RA_{1.2} \mid AI_{1.1}, AI_{2.3})$$

$$(IA_{3.2,1.3}, AR_{3.2,1.3}) \quad (RA_{3.1,2.3}, AI_{3.1,2.3})$$

$$3.1_I \quad 2.2_A \quad 1.1_R \quad \times \quad 1.1_R \quad 2.2_A \quad 1.3_R$$

$$(IA_{3.2}, IA_{1.2} \mid AR_{2.1}, AR_{2.1}) \quad \times \quad (RA_{1.2}, RA_{1.2} \mid AI_{2.1}, AI_{2.3})$$

$$(IA_{3.2,2.1}, AR_{1.2,2.1}) \quad (RA_{1.2,2.3}, AI_{1.2,2.3})$$

$$3.1_I \quad 2.2_A \quad 1.2_R \quad \times \quad 2.1_A \quad 2.2_A \quad 1.3_R$$

$$(IA_{3.2}, IA_{1.2} \mid AR_{2.1}, AR_{2.2}) \quad \times \quad (RA_{2.2}, RA_{1.2} \mid AI_{2.1}, AI_{2.3})$$

$$(IA_{3.2,2.2}, AR_{3.2,2.2}) \quad (RA_{2.2,2.3}, AI_{2.2,2.3})$$

$$\begin{array}{lcl}
3.1_I \ 2.2_A \ 1.3_R & \times & 3.1_I \ 2.2_A \ 1.3_R \\
(IA_{3,2}, IA_{1,2} \mid AR_{2,1}, AR_{2,3}) & \times & (RA_{3,2}, RA_{1,2} \mid AI_{2,1}, AI_{2,3}) \\
(IA_{3,2,2,3}, AR_{3,2,2,3}) & & (RA_{3,2,2,3}, AI_{3,2,2,3})
\end{array}$$

$$\begin{array}{lcl}
3.1_I \ 2.3_A \ 1.1_R & \times & 1.1_R \ 3.2_I \ 1.3_R \\
(IA_{3,2}, IA_{1,3} \mid AR_{2,1}, AR_{3,1}) & \times & (RA_{1,3}, RA_{1,2} \mid AI_{3,1}, AI_{2,3}) \\
(IA_{3,2,3,1}, AR_{3,2,3,1}) & & (RA_{1,3,2,3}, AI_{1,3,2,3})
\end{array}$$

$$\begin{array}{lcl}
3.1_I \ 2.3_A \ 1.2_R & \times & 2.1_A \ 3.2_I \ 1.3_R \\
(IA_{3,2}, IA_{1,3} \mid AR_{2,1}, AR_{3,2}) & \times & (RA_{2,3}, RA_{1,2} \mid AI_{3,1}, AI_{2,3}) \\
(IA_{3,2,3,2}, AR_{3,2,3,2}) & & (RA_{2,3,2,3}, AI_{2,3,2,3})
\end{array}$$

$$\begin{array}{lcl}
3.1_I \ 2.3_A \ 1.3_R & \times & 3.1_I \ 3.2_I \ 1.3_R \\
(IA_{3,2}, IA_{1,3} \mid AR_{2,1}, AR_{3,3}) & \times & (RA_{3,3}, RA_{1,2} \mid AI_{3,1}, AI_{2,3}) \\
(IA_{3,2,3,3}, AR_{3,2,3,3}) & & (RA_{3,3,2,3}, AI_{3,3,2,3})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.1_A \ 1.1_R & \times & 1.1_R \ 1.2_R \ 2.3_A \\
(IA_{3,2}, IA_{2,1} \mid AR_{2,1}, AR_{1,1}) & \times & (RA_{1,1}, RA_{1,2} \mid AI_{1,2}, AI_{2,3}) \\
(IA_{3,2,1,1}, AR_{3,2,1,1}) & & (RA_{1,1,2,3}, AI_{1,1,2,3})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.1_A \ 1.2_R & \times & 2.1_A \ 1.2_R \ 2.3_A \\
(IA_{3,2}, IA_{2,1} \mid AR_{2,1}, AR_{1,2}) & \times & (RA_{2,1}, RA_{1,2} \mid AI_{1,2}, AI_{2,3}) \\
(IA_{3,2,1,2}, AR_{3,2,1,2}) & & (RA_{2,1,2,3}, AI_{2,1,2,3})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.1_A \ 1.3_R & \times & 3.1_I \ 1.2_R \ 2.3_A \\
(IA_{3,2}, IA_{2,1} \mid AR_{2,1}, AR_{1,3}) & \times & (RA_{3,1}, RA_{1,2} \mid AI_{1,2}, AI_{2,3}) \\
(IA_{3,2,1,3}, AR_{3,2,1,3}) & & (RA_{3,1,2,3}, AI_{3,1,2,3})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.2_A \ 1.1_R & \times & 1.1_R \ 2.2_A \ 2.3_A \\
(IA_{3.2}, IA_{2.2} \mid AR_{2.1}, AR_{2.1}) & \times & (RA_{1.2}, RA_{1.2} \mid AI_{2.2}, AI_{2.3}) \\
(IA_{3.2,2.1}, AR_{3.2,2.1}) & & (RA_{1.2,2.3}, AI_{1.2,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.2_A \ 1.2_R & \times & 2.1_A \ 2.2_A \ 2.3_A \\
(IA_{3.2}, IA_{2.2} \mid AR_{2.1}, AR_{2.2}) & \times & (RA_{2.2}, RA_{1.2} \mid AI_{2.2}, AI_{2.3}) \\
(IA_{3.2,2.2}, AR_{3.2,2.2}) & & (RA_{2.2,2.3}, AI_{2.2,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.2_A \ 1.3_R & \times & 3.1_I \ 2.2_A \ 2.3_A \\
(IA_{3.2}, IA_{2.2} \mid AR_{2.1}, AR_{2.3}) & \times & (RA_{3.2}, RA_{1.2} \mid AI_{2.2}, AI_{2.3}) \\
(IA_{3.2,2.3}, AR_{3.2,2.3}) & & (RA_{3.2,2.3}, AI_{3.2,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.3_A \ 1.1_R & \times & 1.1_R \ 3.2_I \ 2.3_A \\
(IA_{3.2}, IA_{2.3} \mid AR_{2.1}, AR_{3.1}) & \times & (RA_{1.3}, RA_{1.2} \mid AI_{3.2}, AI_{2.3}) \\
(IA_{3.2,3.1}, AR_{3.2,3.1}) & & (RA_{1.3,2.3}, AI_{1.3,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.3_A \ 1.2_R & \times & 2.1_A \ 3.2_I \ 2.3_A \\
(IA_{3.2}, IA_{2.3} \mid AR_{2.1}, AR_{3.2}) & \times & (RA_{2.3}, RA_{1.2} \mid AI_{3.2}, AI_{2.3}) \\
(IA_{3.2,3.2}, AR_{3.2,3.2}) & & (RA_{2.3,2.3}, AI_{2.3,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.2_I \ 2.3_A \ 1.3_R & \times & 3.1_I \ 3.2_I \ 2.3_A \\
(IA_{3.2}, IA_{2.3} \mid AR_{2.1}, AR_{3.3}) & \times & (RA_{3.3}, RA_{1.2} \mid AI_{3.2}, AI_{2.3}) \\
(IA_{3.2,3.3}, AR_{3.2,3.3}) & & (RA_{3.3,2.3}, AI_{3.3,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.3_I \ 2.1_A \ 1.1_R & \times & 1.1_R \ 1.2_R \ 3.3_I \\
(IA_{3.2}, IA_{3.1} \mid AR_{2.1}, AR_{1.1}) & \times & (RA_{1.1}, RA_{1.2} \mid AI_{1.3}, AI_{2.3}) \\
(IA_{3.2,1.1}, AR_{3.2,1.1}) & & (RA_{1.1,2.3}, AI_{1.1,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.3_I \ 2.1_A \ 1.2_R & \times & 2.1_A \ 1.2_R \ 3.3_I \\
(\text{IA}_{3.2}, \text{IA}_{3.1} \mid \text{AR}_{2.1}, \text{AR}_{1.2}) & \times & (\text{RA}_{2.1}, \text{RA}_{1.2} \mid \text{AI}_{1.3}, \text{AI}_{2.3}) \\
(\text{IA}_{3.2,1.2}, \text{AR}_{3.2,1.2}) & & (\text{RA}_{2.1,2.3}, \text{AI}_{2.1,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.3_I \ 2.1_A \ 1.3_R & \times & 3.1_I \ 1.2_R \ 3.3_I \\
(\text{IA}_{3.2}, \text{IA}_{3.1} \mid \text{AR}_{2.1}, \text{AR}_{1.3}) & \times & (\text{RA}_{3.1}, \text{RA}_{1.2} \mid \text{AI}_{1.3}, \text{AI}_{2.3}) \\
(\text{IA}_{3.2,1.3}, \text{AR}_{3.2,1.3}) & & (\text{RA}_{3.1,2.3}, \text{AI}_{3.1,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.3_I \ 2.2_A \ 1.1_R & \times & 1.1_R \ 2.2_A \ 3.3_I \\
(\text{IA}_{3.2}, \text{IA}_{3.2} \mid \text{AR}_{2.1}, \text{AR}_{2.1}) & \times & (\text{RA}_{1.2}, \text{RA}_{1.2} \mid \text{AI}_{2.3}, \text{AI}_{2.3}) \\
(\text{IA}_{3.2,2.1}, \text{AR}_{3.2,2.1}) & & (\text{RA}_{1.2,2.3}, \text{AI}_{1.2,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.3_I \ 2.2_A \ 1.2_R & \times & 2.1_A \ 2.2_A \ 3.3_I \\
(\text{IA}_{3.2}, \text{IA}_{3.2} \mid \text{AR}_{2.1}, \text{AR}_{2.2}) & \times & (\text{RA}_{2.2}, \text{RA}_{1.2} \mid \text{AI}_{2.3}, \text{AI}_{2.3}) \\
(\text{IA}_{3.2,2.2}, \text{AR}_{3.2,2.2}) & & (\text{RA}_{2.2,2.3}, \text{AI}_{2.2,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.3_I \ 2.2_A \ 1.3_R & \times & 3.1_I \ 2.2_A \ 3.3_I \\
(\text{IA}_{3.2}, \text{IA}_{3.2} \mid \text{AR}_{2.1}, \text{AR}_{2.3}) & \times & (\text{RA}_{3.2}, \text{RA}_{1.2} \mid \text{AI}_{2.3}, \text{AI}_{2.3}) \\
(\text{IA}_{3.2,2.3}, \text{AR}_{3.2,2.3}) & & (\text{RA}_{3.2,2.3}, \text{AI}_{3.2,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.3_I \ 2.3_A \ 1.1_R & \times & 1.1_R \ 3.2_I \ 3.3_I \\
(\text{IA}_{3.2}, \text{IA}_{3.3} \mid \text{AR}_{2.1}, \text{AR}_{3.1}) & \times & (\text{RA}_{1.3}, \text{RA}_{1.2} \mid \text{AI}_{3.3}, \text{AI}_{2.3}) \\
(\text{IA}_{3.2,3.1}, \text{AR}_{3.2,3.1}) & & (\text{RA}_{1.3,2.3}, \text{AI}_{1.3,2.3})
\end{array}$$

$$\begin{array}{lcl}
3.3_I \ 2.3_A \ 1.2_R & \times & 2.1_A \ 3.2_I \ 3.3_I \\
(\text{IA}_{3.2}, \text{IA}_{3.3} \mid \text{AR}_{2.1}, \text{AR}_{3.2}) & \times & (\text{RA}_{2.3}, \text{RA}_{1.2} \mid \text{AI}_{3.3}, \text{AI}_{2.3}) \\
(\text{IA}_{3.2,3.2}, \text{AR}_{3.2,3.2}) & & (\text{RA}_{2.3,2.3}, \text{AI}_{2.3,2.3})
\end{array}$$

$3.3_I \ 2.3_A \ 1.3_R \quad \times \quad 3.1_I \ 3.2_I \ 3.3_I$

$(IA_{3.2}, IA_{3.3} \mid AR_{2.1}, AR_{3.3}) \quad \times \quad (RA_{3.3}, RA_{1.2} \mid AI_{3.3}, AI_{2.3})$

$(IA_{3.2,3.3}, AR_{3.2,3.3}) \quad (RA_{3.3,2.3}, AI_{3.3,2.3})$

Literatur

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11.1.2026