

Verschränkte semiotische konverse Systemrelationen

1. Systemrelationen und konverse Systemrelationen wurden in Toth (2025a, b) in die Semiotik eingeführt. Zu Verschränkungen in der Semiotik vgl. Toth (2025c). Im folgenden werden verschränkte semiotische konverse Systemrelationen bifunktoriell komponiert. (Zu nicht-konversen semiotischen Systemrelationen vgl. Toth 2025d).

2. Konverse Systemrelationen

$$\begin{array}{l} I_{3.1} \quad A_{2.1} \quad R_{1.1} \quad \times \quad R_{1.1} \quad R_{1.2} \quad R_{1.3} \\ (I, A_{3.1,2.1} \mid A, R_{2.1,1.1}) \quad \times \quad (R, R_{1.1,1.2} \mid R, R_{1.2,1.3}) \\ \\ I_{3.1} \quad A_{2.1} \quad R_{1.2} \quad \times \quad A_{2.1} \quad R_{1.2} \quad R_{1.3} \\ (I, A_{3.1,2.1} \mid A, R_{2.1,1.2}) \quad \times \quad (A, R_{2.1,1.2} \mid R, R_{1.2,1.3}) \\ \\ I_{3.1} \quad A_{2.1} \quad R_{1.3} \quad \times \quad I_{3.1} \quad R_{1.2} \quad R_{1.3} \\ (I, A_{3.1,2.1} \mid A, R_{2.1,1.3}) \quad \times \quad (I, R_{3.1,1.2} \mid R, R_{1.2,1.3}) \\ \\ I_{3.1} \quad A_{2.2} \quad R_{1.1} \quad \times \quad R_{1.1} \quad A_{2.2} \quad R_{1.3} \\ (I, A_{3.1,2.2} \mid A, R_{2.2,1.1}) \quad \times \quad (R, A_{1.1,2.2} \mid A, R_{2.2,1.3}) \\ \\ I_{3.1} \quad A_{2.2} \quad R_{1.2} \quad \times \quad A_{2.1} \quad A_{2.2} \quad R_{1.3} \\ (I, A_{3.1,2.2} \mid A, R_{2.2,1.2}) \quad \times \quad (A, A_{2.1,2.2} \mid A, R_{2.2,1.3}) \\ \\ I_{3.1} \quad A_{2.2} \quad R_{1.3} \quad \times \quad I_{3.1} \quad A_{2.2} \quad R_{1.3} \\ (I, A_{3.1,2.2} \mid A, R_{2.2,1.3}) \quad \times \quad (I, A_{3.1,2.2} \mid A, R_{2.2,1.3}) \\ \\ I_{3.1} \quad A_{2.3} \quad R_{1.1} \quad \times \quad R_{1.1} \quad I_{3.2} \quad R_{1.3} \\ (I, A_{3.1,2.3} \mid A, R_{2.3,1.1}) \quad \times \quad (R, I_{1.1,3.2} \mid I, R_{3.2,1.3}) \\ \\ I_{3.1} \quad A_{2.3} \quad R_{1.2} \quad \times \quad A_{2.1} \quad I_{3.2} \quad R_{1.3} \\ (I, A_{3.1,2.3} \mid A, R_{2.3,1.2}) \quad \times \quad (A, I_{2.1,3.2} \mid I, R_{3.2,1.3}) \\ \\ I_{3.1} \quad A_{2.3} \quad R_{1.3} \quad \times \quad I_{3.1} \quad I_{3.2} \quad R_{1.3} \\ (I, A_{3.1,2.3} \mid A, R_{2.3,1.3}) \quad \times \quad (I, I_{3.1,3.2} \mid I, R_{3.2,1.3}) \\ \\ \\ I_{3.2} \quad A_{2.1} \quad R_{1.1} \quad \times \quad R_{1.1} \quad R_{1.2} \quad A_{2.3} \\ (I, A_{3.2,2.1} \mid A, R_{2.1,1.1}) \quad \times \quad (R, R_{1.1,1.2} \mid R, A_{1.2,2.3}) \end{array}$$

$$\begin{array}{ll}
I_{3.2} \ A_{2.1} \ R_{1.2} & \times \ A_{2.1} \ R_{1.2} \ A_{2.3} \\
(I, A_{3.2,2.1} \mid A, R_{2.1,1.2}) & \times \ (A, R_{2.1,1.2} \mid R, A_{1.2,2.3}) \\
I_{3.2} \ A_{2.1} \ R_{1.3} & \times \ I_{3.1} \ R_{1.2} \ A_{2.3} \\
(I, A_{3.2,2.1} \mid A, R_{2.1,1.3}) & \times \ (I, R_{3.1,1.2} \mid R, A_{1.2,2.3}) \\
I_{3.2} \ A_{2.2} \ R_{1.1} & \times \ R_{1.1} \ A_{2.2} \ A_{2.3} \\
(I, A_{3.2,2.2} \mid A, R_{2.2,1.1}) & \times \ (R, A_{1.1,2.2} \mid A, A_{2.2,2.3}) \\
I_{3.2} \ A_{2.2} \ R_{1.2} & \times \ A_{2.1} \ A_{2.2} \ A_{2.3} \\
(I, A_{3.2,2.2} \mid A, R_{2.2,1.2}) & \times \ (A, A_{2.1,2.2} \mid A, A_{2.2,2.3}) \\
I_{3.2} \ A_{2.2} \ R_{1.3} & \times \ I_{3.1} \ A_{2.2} \ A_{2.3} \\
(I, A_{3.2,2.2} \mid A, R_{2.2,1.3}) & \times \ (I, A_{3.1,2.2} \mid A, A_{2.2,2.3}) \\
I_{3.2} \ A_{2.3} \ R_{1.1} & \times \ R_{1.1} \ I_{3.2} \ A_{2.3} \\
(I, A_{3.2,2.3} \mid A, R_{2.3,1.1}) & \times \ (R, I_{1.1,3.2} \mid I, A_{3.2,2.3}) \\
I_{3.2} \ A_{2.3} \ R_{1.2} & \times \ A_{2.1} \ I_{3.2} \ A_{2.3} \\
(I, A_{3.2,2.3} \mid A, R_{2.3,1.2}) & \times \ (A, I_{2.1,3.2} \mid I, A_{3.2,2.3}) \\
I_{3.2} \ A_{2.3} \ R_{1.3} & \times \ I_{3.1} \ I_{3.2} \ A_{2.3} \\
(I, A_{3.2,2.3} \mid A, R_{2.3,1.3}) & \times \ (I, I_{3.1,3.2} \mid I, A_{3.2,2.3})
\end{array}$$

$$\begin{array}{ll}
I_{3.3} \ A_{2.1} \ R_{1.1} & \times \ R_{1.1} \ R_{1.2} \ I_{3.3} \\
(I, A_{3.3,2.1} \mid A, R_{2.1,1.1}) & \times \ (R, R_{1.1,1.2} \mid R, I_{1.2,3.3}) \\
I_{3.3} \ A_{2.1} \ R_{1.2} & \times \ A_{2.1} \ R_{1.2} \ I_{3.3} \\
(I, A_{3.3,2.1} \mid A, R_{2.1,1.1}) & \times \ (A, R_{2.1,1.2} \mid R, I_{1.2,3.3}) \\
I_{3.3} \ A_{2.1} \ R_{1.3} & \times \ I_{3.1} \ R_{1.2} \ I_{3.3} \\
(I, A_{3.3,2.1} \mid A, R_{2.1,1.1}) & \times \ (I, R_{3.1,1.2} \mid R, I_{1.2,3.3}) \\
I_{3.3} \ A_{2.2} \ R_{1.1} & \times \ R_{1.1} \ A_{2.2} \ I_{3.3} \\
(I, A_{3.3,2.1} \mid A, R_{2.1,1.1}) & \times \ (R, A_{1.1,2.2} \mid A, I_{2.2,3.3}) \\
I_{3.3} \ A_{2.2} \ R_{1.2} & \times \ A_{2.1} \ A_{2.2} \ I_{3.3} \\
(I, A_{3.3,2.1} \mid A, R_{2.1,1.1}) & \times \ (A, A_{2.1,2.2} \mid A, I_{2.2,3.3}) \\
I_{3.3} \ A_{2.2} \ R_{1.3} & \times \ I_{3.1} \ A_{2.2} \ I_{3.3}
\end{array}$$

$$(I, A_{3.3, 2.1} \mid A, R_{2.1, 1.1}) \quad \times \quad (I, A_{3.1, 2.2} \mid A, I_{2.2, 3.3})$$

$$I_{3.3} \quad A_{2.3} \quad R_{1.1} \quad \times \quad R_{1.1} \quad I_{3.2} \quad I_{3.3}$$

$$(I, A_{3.3, 2.1} \mid A, R_{2.1, 1.1}) \quad \times \quad (R, I_{1.1, 3.2} \mid I, I_{3.2, 3.3})$$

$$I_{3.3} \quad A_{2.3} \quad R_{1.2} \quad \times \quad A_{2.1} \quad I_{3.2} \quad I_{3.3}$$

$$(I, A_{3.3, 2.1} \mid A, R_{2.1, 1.1}) \quad \times \quad (A, I_{2.1, 3.2} \mid I, I_{3.2, 3.3})$$

$$I_{3.3} \quad A_{2.3} \quad R_{1.3} \quad \times \quad I_{3.1} \quad I_{3.2} \quad I_{3.3}$$

$$(I, A_{3.3, 2.1} \mid A, R_{2.1, 1.1}) \quad \times \quad (I, I_{3.1, 3.2} \mid I, I_{3.2, 3.3})$$

Literatur

Toth, Alfred, Zeichenraum und Systemraum. In: Electronic Journal for Mathematical Semiotics, 2025a

Toth, Alfred, Konverse semiotische Systemrelationen. In: Electronic Journal for Mathematical Semiotics, 2025b

Toth, Alfred, Typologie der Verschränkungen der Zeichenbezüge. In: Electronic Journal for Mathematical Semiotics, 2025c

Toth, Alfred, Verschränkte semiotische Systemrelationen. In: Electronic Journal for Mathematical Semiotics, 2025d

10.1.2026