

## **Pariser Modelle zur Grundlegung einer ontischen Kategorientheorie LXIX**

1. Meine „Grammatik der Stadt Paris“, erschienen als Publikation des von mir seit 2001 geleiteten „Semiotisch-Technischen Laboratoriums“ (Toth 2016a), stellte in 2 Bänden auf insgesamt 507 Seiten zum ersten Mal eine Grammatik dar, deren Elemente nicht Laute, Silben, Wörter und Sätze (sowie allenfalls Texte), sondern Häuser, Straßen, Plätze und Einfriedungen und deren Materialien nicht Phoneme oder Grapheme, sondern Stein, Holz, Glas u.a. sind. Es handelt sich dabei jedoch keineswegs um die satzsaft bekannte und unwissenschaftliche strukturalistische (sowie mittlerweile längst überholte) Vorstellung des „Lesens einer Stadt“ bzw. der „Stadt als Text“, sondern um eine funktionale bzw. abbildungstheoretische Beschreibung einer Stadt, basierend auf invarianten ontischen Eigenschaften (vgl. Toth 2013) sowie auf invarianten ontischen Relationen (vgl. Toth 2016b). Die im folgenden verwendeten Zeichen für Morphismen, Operatoren usw. sind in den referierten Arbeiten definiert. Für alle in den „Pariser Modellen“ vorausgesetzten theoretischen Grundlagen sei auf Toth (2017) verwiesen.

### **2. Das vollständige System funktionaler ontischer Morphismen**

#### **2.1. C-Morphismen**

##### **2.1.1. $\alpha_C = f(S^*)$**

$$\begin{aligned}(\alpha_C = (X_\lambda \rightarrow Y_Z)) &= f(S) \\ (\alpha_C = (X_\lambda \rightarrow Y_Z)) &= f(U) \\ (\alpha_C = (X_\lambda \rightarrow Y_Z)) &= f(E)\end{aligned}$$

##### **2.1.2. $\alpha_C = f(B)$**

$$\begin{aligned}(\alpha_C = (X_\lambda \rightarrow Y_Z)) &= f(\text{Sys}) \\ (\alpha_C = (X_\lambda \rightarrow Y_Z)) &= f(\text{Abb}) \\ (\alpha_C = (X_\lambda \rightarrow Y_Z)) &= f(\text{Rep})\end{aligned}$$

##### **2.1.3. $\alpha_C = f(R^*)$**

$$\begin{aligned}(\alpha_C = (X_\lambda \rightarrow Y_Z)) &= f(\text{Ad}) \\ (\alpha_C = (X_\lambda \rightarrow Y_Z)) &= f(\text{Adj}) \\ (\alpha_C = (X_\lambda \rightarrow Y_Z)) &= f(\text{Ex})\end{aligned}$$

##### **2.1.4. $\beta_C = f(S^*)$**

$$\begin{aligned}(\beta_C = (Y_Z \rightarrow Z_\rho)) &= f(S) \\ (\beta_C = (Y_Z \rightarrow Z_\rho)) &= f(U) \\ (\beta_C = (Y_Z \rightarrow Z_\rho)) &= f(E)\end{aligned}$$

##### **2.1.5. $\beta_C = f(B)$**

$$\begin{aligned}(\beta_C = (Y_Z \rightarrow Z_\rho)) &= f(\text{Sys}) \\ (\beta_C = (Y_Z \rightarrow Z_\rho)) &= f(\text{Abb}) \\ (\beta_C = (Y_Z \rightarrow Z_\rho)) &= f(\text{Rep})\end{aligned}$$

##### **2.1.6. $\beta_C = f(R^*)$**

$$\begin{aligned}(\beta_C = (Y_Z \rightarrow Z_\rho)) &= f(\text{Ad}) \\ (\beta_C = (Y_Z \rightarrow Z_\rho)) &= f(\text{Adj}) \\ (\beta_C = (Y_Z \rightarrow Z_\rho)) &= f(\text{Ex})\end{aligned}$$

##### **2.1.7. $\beta\alpha_C = f(S^*)$**

$$\begin{aligned}(\beta\alpha_C = (X_\lambda \rightarrow Z_\rho)) &= f(S) \\ (\beta\alpha_C = (X_\lambda \rightarrow Z_\rho)) &= f(U) \\ (\beta\alpha_C = (X_\lambda \rightarrow Z_\rho)) &= f(E)\end{aligned}$$

##### **2.1.8. $\beta\alpha_C = f(B)$**

$$\begin{aligned}(\beta\alpha_C = (X_\lambda \rightarrow Z_\rho)) &= f(\text{Sys}) \\ (\beta\alpha_C = (X_\lambda \rightarrow Z_\rho)) &= f(\text{Abb}) \\ (\beta\alpha_C = (X_\lambda \rightarrow Z_\rho)) &= f(\text{Rep})\end{aligned}$$

##### **2.1.9. $\beta\alpha_C = f(R^*)$**

$$\begin{aligned}(\beta\alpha_C = (X_\lambda \rightarrow Z_\rho)) &= f(\text{Ad}) \\ (\beta\alpha_C = (X_\lambda \rightarrow Z_\rho)) &= f(\text{Adj}) \\ (\beta\alpha_C = (X_\lambda \rightarrow Z_\rho)) &= f(\text{Ex})\end{aligned}$$

##### **2.1.10. $\alpha^\circ_C = f(S^*)$**

$$\begin{aligned}(\alpha^\circ_C = (Y_Z \rightarrow X_\lambda)) &= f(S) \\ (\alpha^\circ_C = (Y_Z \rightarrow X_\lambda)) &= f(U) \\ (\alpha^\circ_C = (Y_Z \rightarrow X_\lambda)) &= f(E)\end{aligned}$$

##### **2.1.11. $\alpha^\circ_C = f(B)$**

$$\begin{aligned}(\alpha^\circ_C = (Y_Z \rightarrow X_\lambda)) &= f(\text{Sys}) \\ (\alpha^\circ_C = (Y_Z \rightarrow X_\lambda)) &= f(\text{Abb}) \\ (\alpha^\circ_C = (Y_Z \rightarrow X_\lambda)) &= f(\text{Rep})\end{aligned}$$

##### **2.1.12. $\alpha^\circ_C = f(R^*)$**

$$\begin{aligned}(\alpha^\circ_C = (Y_Z \rightarrow X_\lambda)) &= f(\text{Ad}) \\ (\alpha^\circ_C = (Y_Z \rightarrow X_\lambda)) &= f(\text{Adj}) \\ (\alpha^\circ_C = (Y_Z \rightarrow X_\lambda)) &= f(\text{Ex})\end{aligned}$$

**2.1.13.  $\beta^\circ_C = f(S^*)$** 

$$\begin{aligned}
(\beta^\circ_C = (Z_\rho \rightarrow Y_Z)) &= f(S) \\
(\beta^\circ_C = (Z_\rho \rightarrow Y_Z)) &= f(U) \\
(\beta^\circ_C = (Z_\rho \rightarrow Y_Z)) &= f(E)
\end{aligned}$$

**2.1.14.  $\beta^\circ_C = f(B)$** 

$$\begin{aligned}
(\beta^\circ_C = (Z_\rho \rightarrow Y_Z)) &= f(\text{Sys}) \\
(\beta^\circ_C = (Z_\rho \rightarrow Y_Z)) &= f(\text{Abb}) \\
(\beta^\circ_C = (Z_\rho \rightarrow Y_Z)) &= f(\text{Rep})
\end{aligned}$$

**2.1.15.  $\beta^\circ_C = f(R^*)$** 

$$\begin{aligned}
(\beta^\circ_C = (Z_\rho \rightarrow Y_Z)) &= f(\text{Ad}) \\
(\beta^\circ_C = (Z_\rho \rightarrow Y_Z)) &= f(\text{Adj}) \\
(\beta^\circ_C = (Z_\rho \rightarrow Y_Z)) &= f(\text{Ex})
\end{aligned}$$

**2.1.16.  $\alpha^\circ\beta^\circ_C = f(S^*)$** 

$$\begin{aligned}
(\alpha^\circ\beta^\circ_C = (Z_\rho \rightarrow X_\lambda)) &= f(S) \\
(\alpha^\circ\beta^\circ_C = (Z_\rho \rightarrow X_\lambda)) &= f(U) \\
(\alpha^\circ\beta^\circ_C = (Z_\rho \rightarrow X_\lambda)) &= f(E)
\end{aligned}$$

**2.1.17.  $\alpha^\circ\beta^\circ_C = f(B)$** 

$$\begin{aligned}
(\alpha^\circ\beta^\circ_C = (Z_\rho \rightarrow X_\lambda)) &= f(\text{Sys}) \\
(\alpha^\circ\beta^\circ_C = (Z_\rho \rightarrow X_\lambda)) &= f(\text{Abb}) \\
(\alpha^\circ\beta^\circ_C = (Z_\rho \rightarrow X_\lambda)) &= f(\text{Rep})
\end{aligned}$$

**2.1.18.  $\alpha^\circ\beta^\circ_C = f(R^*)$** 

$$\begin{aligned}
(\alpha^\circ\beta^\circ_C = (Z_\rho \rightarrow X_\lambda)) &= f(\text{Ad}) \\
(\alpha^\circ\beta^\circ_C = (Z_\rho \rightarrow X_\lambda)) &= f(\text{Adj}) \\
(\alpha^\circ\beta^\circ_C = (Z_\rho \rightarrow X_\lambda)) &= f(\text{Ex})
\end{aligned}$$

**2.1.19.  $\text{id}_C = f(S^*)$** 

$$\begin{aligned}
(\text{id}_{C\lambda} = (X_\lambda \rightarrow X_\lambda)) &= f(S) \\
(\text{id}_{CZ} = (Y_Z \rightarrow Y_Z)) &= f(U) \\
(\text{id}_{C\rho} = (Z_\rho \rightarrow Z_\rho)) &= f(E)
\end{aligned}$$

**2.1.20.  $\text{id}_C = f(B)$** 

$$\begin{aligned}
(\text{id}_{C\lambda} = (X_\lambda \rightarrow X_\lambda)) &= f(\text{Sys}) \\
(\text{id}_{CZ} = (X_\lambda \rightarrow X_\lambda)) &= f(\text{Abb}) \\
(\text{id}_{C\rho} = (X_\lambda \rightarrow X_\lambda)) &= f(\text{Rep})
\end{aligned}$$

**2.1.21.  $\text{id}_C = f(R^*)$** 

$$\begin{aligned}
(\text{id}_{C\lambda} = (X_\lambda \rightarrow X_\lambda)) &= f(\text{Ad}) \\
(\text{id}_{CZ} = (X_\lambda \rightarrow X_\lambda)) &= f(\text{Adj}) \\
(\text{id}_{C\rho} = (X_\lambda \rightarrow X_\lambda)) &= f(\text{Ex})
\end{aligned}$$

**2.2. L-Morphisms****2.2.1.  $\alpha_L = f(S^*)$** 

$$\begin{aligned}
(\alpha_L = (Ex \rightarrow Ad)) &= f(S) \\
(\alpha_L = (Ex \rightarrow Ad)) &= f(U) \\
(\alpha_L = (Ex \rightarrow Ad)) &= f(E)
\end{aligned}$$

**2.2.2.  $\alpha_L = f(B)$** 

$$\begin{aligned}
(\alpha_L = (Ex \rightarrow Ad)) &= f(\text{Sys}) \\
(\alpha_L = (Ex \rightarrow Ad)) &= f(\text{Abb}) \\
(\alpha_L = (Ex \rightarrow Ad)) &= f(\text{Rep})
\end{aligned}$$

**2.2.3.  $\alpha_L = f(R^*)$** 

$$\begin{aligned}
(\alpha_L = (Ex \rightarrow Ad)) &= f(\text{Ad}) \\
(\alpha_L = (Ex \rightarrow Ad)) &= f(\text{Adj}) \\
(\alpha_L = (Ex \rightarrow Ad)) &= f(\text{Ex})
\end{aligned}$$

**2.2.4.  $\beta_L = f(S^*)$** 

$$\begin{aligned}
(\beta_L = (Ad \rightarrow In)) &= f(S) \\
(\beta_L = (Ad \rightarrow In)) &= f(U) \\
(\beta_L = (Ad \rightarrow In)) &= f(E)
\end{aligned}$$

**2.2.5.  $\beta_L = f(B)$** 

$$\begin{aligned}
(\beta_L = (Ad \rightarrow In)) &= f(\text{Sys}) \\
(\beta_L = (Ad \rightarrow In)) &= f(\text{Abb}) \\
(\beta_L = (Ad \rightarrow In)) &= f(\text{Rep})
\end{aligned}$$

**2.2.6.  $\beta_L = f(R^*)$** 

$$\begin{aligned}
(\beta_L = (Ad \rightarrow In)) &= f(\text{Ad}) \\
(\beta_L = (Ad \rightarrow In)) &= f(\text{Adj}) \\
(\beta_L = (Ad \rightarrow In)) &= f(\text{Ex})
\end{aligned}$$

**2.2.7.  $\beta\alpha_L = f(S^*)$** 

$$\begin{aligned}
(\beta\alpha_L = (Ex \rightarrow In)) &= f(S) \\
(\beta\alpha_L = (Ex \rightarrow In)) &= f(U) \\
(\beta\alpha_L = (Ex \rightarrow In)) &= f(E)
\end{aligned}$$

**2.2.8.  $\beta\alpha_L = f(B)$** 

$$\begin{aligned}
(\beta\alpha_L = (Ex \rightarrow In)) &= f(\text{Sys}) \\
(\beta\alpha_L = (Ex \rightarrow In)) &= f(\text{Abb}) \\
(\beta\alpha_L = (Ex \rightarrow In)) &= f(\text{Rep})
\end{aligned}$$

**2.2.9.  $\beta\alpha_L = f(R^*)$** 

$$\begin{aligned}
(\beta\alpha_L = (Ex \rightarrow In)) &= f(\text{Ad}) \\
(\beta\alpha_L = (Ex \rightarrow In)) &= f(\text{Adj}) \\
(\beta\alpha_L = (Ex \rightarrow In)) &= f(\text{Ex})
\end{aligned}$$

**2.2.10.  $\alpha^\circ_L = f(S^*)$** 

$$\begin{aligned}
(\alpha^\circ_L = (Ad \rightarrow Ex)) &= f(S) \\
(\alpha^\circ_L = (Ad \rightarrow Ex)) &= f(U) \\
(\alpha^\circ_L = (Ad \rightarrow Ex)) &= f(E)
\end{aligned}$$

**2.2.11.  $\alpha^\circ_L = f(B)$** 

$$\begin{aligned}
(\alpha^\circ_L = (Ad \rightarrow Ex)) &= f(\text{Sys}) \\
(\alpha^\circ_L = (Ad \rightarrow Ex)) &= f(\text{Abb}) \\
(\alpha^\circ_L = (Ad \rightarrow Ex)) &= f(\text{Rep})
\end{aligned}$$

**2.2.12.  $\alpha^\circ_L = f(R^*)$** 

$$\begin{aligned}
(\alpha^\circ_L = (Ad \rightarrow Ex)) &= f(\text{Ad}) \\
(\alpha^\circ_L = (Ad \rightarrow Ex)) &= f(\text{Adj}) \\
(\alpha^\circ_L = (Ad \rightarrow Ex)) &= f(\text{Ex})
\end{aligned}$$

**2.2.13.  $\beta^\circ_L = f(S^*)$** 

$$(\beta^\circ_L = (\text{In} \rightarrow \text{Ad})) = f(S)$$

$$(\beta^\circ_L = (\text{In} \rightarrow \text{Ad})) = f(U)$$

$$(\beta^\circ_L = (\text{In} \rightarrow \text{Ad})) = f(E)$$

**2.2.14.  $\beta^\circ_L = f(B)$** 

$$(\beta^\circ_L = (\text{In} \rightarrow \text{Ad})) = f(\text{Sys})$$

$$(\beta^\circ_L = (\text{In} \rightarrow \text{Ad})) = f(\text{Abb})$$

$$(\beta^\circ_L = (\text{In} \rightarrow \text{Ad})) = f(\text{Rep})$$

**2.2.15.  $\beta^\circ_L = f(R^*)$** 

$$(\beta^\circ_L = (\text{In} \rightarrow \text{Ad})) = f(\text{Ad})$$

$$(\beta^\circ_L = (\text{In} \rightarrow \text{Ad})) = f(\text{Adj})$$

$$(\beta^\circ_L = (\text{In} \rightarrow \text{Ad})) = f(\text{Ex})$$

**2.2.16.  $\alpha^\circ \beta^\circ_L = f(S^*)$** 

$$(\alpha^\circ \beta^\circ_L = (\text{In} \rightarrow \text{Ex})) = f(S)$$

$$(\alpha^\circ \beta^\circ_L = (\text{In} \rightarrow \text{Ex})) = f(U)$$

$$(\alpha^\circ \beta^\circ_L = (\text{In} \rightarrow \text{Ex})) = f(E)$$

**2.2.17.  $\alpha^\circ \beta^\circ_L = f(B)$** 

$$(\alpha^\circ \beta^\circ_L = (\text{In} \rightarrow \text{Ex})) = f(\text{Sys})$$

$$(\alpha^\circ \beta^\circ_L = (\text{In} \rightarrow \text{Ex})) = f(\text{Abb})$$

$$(\alpha^\circ \beta^\circ_L = (\text{In} \rightarrow \text{Ex})) = f(\text{Rep})$$

**2.2.18.  $\alpha^\circ \beta^\circ_L = f(R^*)$** 

$$(\alpha^\circ \beta^\circ_L = (\text{In} \rightarrow \text{Ex})) = f(\text{Ad})$$

$$(\alpha^\circ \beta^\circ_L = (\text{In} \rightarrow \text{Ex})) = f(\text{Adj})$$

$$(\alpha^\circ \beta^\circ_L = (\text{In} \rightarrow \text{Ex})) = f(\text{Ex})$$

**2.2.19.  $\text{id}_L = f(S^*)$** 

$$(\text{id}_{L\text{Ex}} = (\text{Ex} \rightarrow \text{Ex})) = f(S)$$

$$(\text{id}_{L\text{Ad}} = (\text{Ad} \rightarrow \text{Ad})) = f(U)$$

$$(\text{id}_{L\text{In}} = (\text{In} \rightarrow \text{In})) = f(E)$$

**2.2.20.  $\text{id}_L = f(B)$** 

$$(\text{id}_{L\text{Ex}} = (\text{Ex} \rightarrow \text{Ex})) = f(\text{Sys})$$

$$(\text{id}_{L\text{Ad}} = (\text{Ad} \rightarrow \text{Ad})) = f(\text{Abb})$$

$$(\text{id}_{L\text{In}} = (\text{In} \rightarrow \text{In})) = f(\text{Rep})$$

**2.2.21.  $\text{id}_L = f(R^*)$** 

$$(\text{id}_{L\text{Ex}} = (\text{Ex} \rightarrow \text{Ex})) = f(\text{Ad})$$

$$(\text{id}_{L\text{Ad}} = (\text{Ad} \rightarrow \text{Ad})) = f(\text{Adj})$$

$$(\text{id}_{L\text{In}} = (\text{In} \rightarrow \text{In})) = f(\text{Ex})$$

**2.3. O-Morphisms****2.3.1.  $\alpha_O = f(S^*)$** 

$$(\alpha_O = (\text{Sub} \rightarrow \text{Koo})) = f(S)$$

$$(\alpha_O = (\text{Sub} \rightarrow \text{Koo})) = f(U)$$

$$(\alpha_O = (\text{Sub} \rightarrow \text{Koo})) = f(E)$$

**2.3.2.  $\alpha_O = f(B)$** 

$$(\alpha_O = (\text{Sub} \rightarrow \text{Koo})) = f(\text{Sys})$$

$$(\alpha_O = (\text{Sub} \rightarrow \text{Koo})) = f(\text{Abb})$$

$$(\alpha_O = (\text{Sub} \rightarrow \text{Koo})) = f(\text{Rep})$$

**2.3.3.  $\alpha_O = f(R^*)$** 

$$(\alpha_O = (\text{Sub} \rightarrow \text{Koo})) = f(\text{Ad})$$

$$(\alpha_O = (\text{Sub} \rightarrow \text{Koo})) = f(\text{Adj})$$

$$(\alpha_O = (\text{Sub} \rightarrow \text{Koo})) = f(\text{Ex})$$

**2.3.4.  $\beta_O = f(S^*)$** 

$$(\beta_O = (\text{Koo} \rightarrow \text{Sup})) = f(S)$$

$$(\beta_O = (\text{Koo} \rightarrow \text{Sup})) = f(U)$$

$$(\beta_O = (\text{Koo} \rightarrow \text{Sup})) = f(E)$$

**2.3.5.  $\beta_O = f(B)$** 

$$(\beta_O = (\text{Koo} \rightarrow \text{Sup})) = f(\text{Sys})$$

$$(\beta_O = (\text{Koo} \rightarrow \text{Sup})) = f(\text{Abb})$$

$$(\beta_O = (\text{Koo} \rightarrow \text{Sup})) = f(\text{Rep})$$

**2.3.6.  $\beta_O = f(R^*)$** 

$$(\beta_O = (\text{Koo} \rightarrow \text{Sup})) = f(\text{Ad})$$

$$(\beta_O = (\text{Koo} \rightarrow \text{Sup})) = f(\text{Adj})$$

$$(\beta_O = (\text{Koo} \rightarrow \text{Sup})) = f(\text{Ex})$$

**2.3.7.  $\beta\alpha_O = f(S^*)$** 

$$(\beta\alpha_O = (\text{Sub} \rightarrow \text{Sup})) = f(S)$$

$$(\beta\alpha_O = (\text{Sub} \rightarrow \text{Sup})) = f(U)$$

$$(\beta\alpha_O = (\text{Sub} \rightarrow \text{Sup})) = f(E)$$

**2.3.8.  $\beta\alpha_O = f(B)$** 

$$(\beta\alpha_O = (\text{Sub} \rightarrow \text{Sup})) = f(\text{Sys})$$

$$(\beta\alpha_O = (\text{Sub} \rightarrow \text{Sup})) = f(\text{Abb})$$

$$(\beta\alpha_O = (\text{Sub} \rightarrow \text{Sup})) = f(\text{Rep})$$

**2.3.9.  $\beta\alpha_O = f(R^*)$** 

$$(\beta\alpha_O = (\text{Sub} \rightarrow \text{Sup})) = f(\text{Ad})$$

$$(\beta\alpha_O = (\text{Sub} \rightarrow \text{Sup})) = f(\text{Adj})$$

$$(\beta\alpha_O = (\text{Sub} \rightarrow \text{Sup})) = f(\text{Ex})$$

**2.3.10.  $\alpha^\circ_O = f(S^*)$** 

$$(\alpha^\circ_O = (\text{Koo} \rightarrow \text{Sub})) = f(S)$$

$$(\alpha^\circ_O = (\text{Koo} \rightarrow \text{Sub})) = f(U)$$

$$(\alpha^\circ_O = (\text{Koo} \rightarrow \text{Sub})) = f(E)$$

**2.3.11.  $\alpha^\circ_O = f(B)$** 

$$(\alpha^\circ_O = (\text{Koo} \rightarrow \text{Sub})) = f(\text{Sys})$$

$$(\alpha^\circ_O = (\text{Koo} \rightarrow \text{Sub})) = f(\text{Abb})$$

$$(\alpha^\circ_O = (\text{Koo} \rightarrow \text{Sub})) = f(\text{Rep})$$

**2.3.12.  $\alpha^\circ_O = f(R^*)$** 

$$(\alpha^\circ_O = (\text{Koo} \rightarrow \text{Sub})) = f(\text{Ad})$$

$$(\alpha^\circ_O = (\text{Koo} \rightarrow \text{Sub})) = f(\text{Adj})$$

$$(\alpha^\circ_O = (\text{Koo} \rightarrow \text{Sub})) = f(\text{Ex})$$

**2.3.13.  $\beta^\circ_o = f(S^*)$** 

$$\begin{aligned}(\beta^\circ_o = (\text{Sup} \rightarrow \text{Koo})) &= f(S) \\(\beta^\circ_o = (\text{Sup} \rightarrow \text{Koo})) &= f(U) \\(\beta^\circ_o = (\text{Sup} \rightarrow \text{Koo})) &= f(E)\end{aligned}$$

**2.3.14.  $\beta^\circ_o = f(B)$** 

$$\begin{aligned}(\beta^\circ_o = (\text{Sup} \rightarrow \text{Koo})) &= f(\text{Sys}) \\(\beta^\circ_o = (\text{Sup} \rightarrow \text{Koo})) &= f(\text{Abb}) \\(\beta^\circ_o = (\text{Sup} \rightarrow \text{Koo})) &= f(\text{Rep})\end{aligned}$$

**2.3.15.  $\beta^\circ_o = f(R^*)$** 

$$\begin{aligned}(\beta^\circ_o = (\text{Sup} \rightarrow \text{Koo})) &= f(\text{Ad}) \\(\beta^\circ_o = (\text{Sup} \rightarrow \text{Koo})) &= f(\text{Adj}) \\(\beta^\circ_o = (\text{Sup} \rightarrow \text{Koo})) &= f(\text{Ex})\end{aligned}$$

**2.3.16.  $\alpha^\circ\beta^\circ_o = f(S^*)$** 

$$\begin{aligned}(\alpha^\circ\beta^\circ_o = (\text{Sup} \rightarrow \text{Sub})) &= f(S) \\(\alpha^\circ\beta^\circ_o = (\text{Sup} \rightarrow \text{Sub})) &= f(\text{Ad}) \\(\alpha^\circ\beta^\circ_o = (\text{Sup} \rightarrow \text{Sub})) &= f(U) \\(\alpha^\circ\beta^\circ_o = (\text{Sup} \rightarrow \text{Sub})) &= f(\text{Adj}) \\(\alpha^\circ\beta^\circ_o = (\text{Sup} \rightarrow \text{Sub})) &= f(E) \\(\alpha^\circ\beta^\circ_o = (\text{Sup} \rightarrow \text{Sub})) &= f(\text{Ex})\end{aligned}$$

**2.3.17.  $\alpha^\circ\beta^\circ_o = f(B)$** 

$$\begin{aligned}(\alpha^\circ\beta^\circ_o = (\text{Sup} \rightarrow \text{Sub})) &= f(\text{Sys}) \\(\alpha^\circ\beta^\circ_o = (\text{Sup} \rightarrow \text{Sub})) &= f(\text{Abb}) \\(\alpha^\circ\beta^\circ_o = (\text{Sup} \rightarrow \text{Sub})) &= f(\text{Rep})\end{aligned}$$

**2.3.18.  $\alpha^\circ\beta^\circ_o = f(R^*)$** 

$$\begin{aligned}(\alpha^\circ\beta^\circ_o = (\text{Sup} \rightarrow \text{Sub})) &= f(\text{Ad}) \\(\alpha^\circ\beta^\circ_o = (\text{Sup} \rightarrow \text{Sub})) &= f(\text{Adj}) \\(\alpha^\circ\beta^\circ_o = (\text{Sup} \rightarrow \text{Sub})) &= f(\text{Ex})\end{aligned}$$

**2.3.19.  $\text{id}_o = f(S^*)$** 

$$\begin{aligned}(\text{id}_{O\text{Sub}} = (\text{Sub} \rightarrow \text{Sub})) &= f(S) \\(\text{id}_{O\text{Sub}} = (\text{Sub} \rightarrow \text{Sub})) &= f(\text{Ad}) \\(\text{id}_{OKoo} = (\text{Koo} \rightarrow \text{Koo})) &= f(U) \\(\text{id}_{OKoo} = (\text{Koo} \rightarrow \text{Koo})) &= f(\text{Adj}) \\(\text{id}_{OSup} = (\text{Sup} \rightarrow \text{Sup})) &= f(E) \\(\text{id}_{OSup} = (\text{Sup} \rightarrow \text{Sup})) &= f(\text{Ex})\end{aligned}$$

**2.3.20.  $\text{id}_o = f(B)$** 

$$\begin{aligned}(\text{id}_{O\text{Sub}} = (\text{Sub} \rightarrow \text{Sub})) &= f(\text{Sys}) \\(\text{id}_{OKoo} = (\text{Koo} \rightarrow \text{Koo})) &= f(\text{Abb}) \\(\text{id}_{OSup} = (\text{Sup} \rightarrow \text{Sup})) &= f(\text{Rep})\end{aligned}$$

**2.3.21.  $\text{id}_o = f(R^*)$** 

$$\begin{aligned}(\text{id}_{O\text{Sub}} = (\text{Sub} \rightarrow \text{Sub})) &= f(\text{Ad}) \\(\text{id}_{OKoo} = (\text{Koo} \rightarrow \text{Koo})) &= f(\text{Adj}) \\(\text{id}_{OSup} = (\text{Sup} \rightarrow \text{Sup})) &= f(\text{Ex})\end{aligned}$$

**2.4. Q-Morphisms****2.4.1.  $\alpha_Q = f(S^*)$** 

$$\begin{aligned}(\alpha_Q = (\text{Adj} \rightarrow \text{Subj})) &= f(S) \\(\alpha_Q = (\text{Adj} \rightarrow \text{Subj})) &= f(U) \\(\alpha_Q = (\text{Adj} \rightarrow \text{Subj})) &= f(E)\end{aligned}$$

**2.4.2.  $\alpha_Q = f(B)$** 

$$\begin{aligned}(\alpha_Q = (\text{Adj} \rightarrow \text{Subj})) &= f(\text{Sys}) \\(\alpha_Q = (\text{Adj} \rightarrow \text{Subj})) &= f(\text{Abb}) \\(\alpha_Q = (\text{Adj} \rightarrow \text{Subj})) &= f(\text{Rep})\end{aligned}$$

**2.4.3.  $\alpha_Q = f(R^*)$** 

$$\begin{aligned}(\alpha_Q = (\text{Adj} \rightarrow \text{Subj})) &= f(\text{Ad}) \\(\alpha_Q = (\text{Adj} \rightarrow \text{Subj})) &= f(\text{Adj}) \\(\alpha_Q = (\text{Adj} \rightarrow \text{Subj})) &= f(\text{Ex})\end{aligned}$$

**2.4.4.  $\beta_Q = f(S^*)$** 

$$\begin{aligned}(\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(S) \\(\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Ad}) \\(\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(U) \\(\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Adj}) \\(\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(E) \\(\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Ex})\end{aligned}$$

**2.4.5.  $\beta_Q = f(B)$** 

$$\begin{aligned}(\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Sys}) \\(\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Abb}) \\(\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Rep})\end{aligned}$$

**2.4.6.  $\beta_Q = f(R^*)$** 

$$\begin{aligned}(\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Ad}) \\(\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Adj}) \\(\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Ex})\end{aligned}$$

**2.4.7.  $\beta\alpha_Q = f(S^*)$** 

$$(\beta\alpha_Q = (\text{Adj} \rightarrow \text{Transj})) = f(S)$$

**2.4.8.  $\beta\alpha_Q = f(B)$** 

$$(\beta\alpha_Q = (\text{Adj} \rightarrow \text{Transj})) = f(\text{Sys})$$

**2.4.9.  $\beta\alpha_Q = f(R^*)$** 

$$(\beta\alpha_Q = (\text{Adj} \rightarrow \text{Transj})) = f(\text{Ad})$$

$$\begin{aligned}
(\beta\alpha_Q = (\text{Adj} \rightarrow \text{Transj})) &= f(U) & (\beta\alpha_Q = (\text{Adj} \rightarrow \text{Transj})) &= f(\text{Abb}) & (\beta\alpha_Q = (\text{Adj} \rightarrow \text{Transj})) &= f(\text{Adj}) \\
(\beta\alpha_Q = (\text{Adj} \rightarrow \text{Transj})) &= f(E) & (\beta\alpha_Q = (\text{Adj} \rightarrow \text{Transj})) &= f(\text{Rep}) & (\beta\alpha_Q = (\text{Adj} \rightarrow \text{Transj})) &= f(\text{Ex})
\end{aligned}$$

#### 2.4.10. $\alpha^\circ_Q = f(S^*)$

#### 2.4.11. $\alpha^\circ_Q = f(B)$

#### 2.4.12. $\alpha^\circ_Q = f(R^*)$

$$\begin{aligned}
(\alpha^\circ_Q = (\text{Subj} \rightarrow \text{Adj})) &= f(S) & (\alpha^\circ_Q = (\text{Subj} \rightarrow \text{Adj})) &= f(\text{Sys}) & (\alpha^\circ_Q = (\text{Subj} \rightarrow V)) &= f(\text{Ad}) \\
(\alpha^\circ_Q = (\text{Subj} \rightarrow \text{Adj})) &= f(U) & (\alpha^\circ_Q = (\text{Subj} \rightarrow \text{Adj})) &= f(\text{Abb}) & (\alpha^\circ_Q = (\text{Subj} \rightarrow \text{Adj})) &= f(\text{Adj}) \\
(\alpha^\circ_Q = (\text{Subj} \rightarrow \text{Adj})) &= f(E) & (\alpha^\circ_Q = (\text{Subj} \rightarrow \text{Adj})) &= f(\text{Rep}) & (\alpha^\circ_Q = (\text{Subj} \rightarrow \text{Adj})) &= f(\text{Ex})
\end{aligned}$$

#### 2.4.13. $\beta^\circ_Q = f(S^*)$

#### 2.4.14. $\beta^\circ_Q = f(B)$

#### 2.4.15. $\beta^\circ_Q = f(R^*)$

$$\begin{aligned}
(\beta^\circ_Q = (\text{Transj} \rightarrow \text{Subj})) &= f(S) & (\beta^\circ_Q = (\text{Transj} \rightarrow \text{Subj})) &= f(\text{Sys}) & (\beta^\circ_Q = (\text{Transj} \rightarrow \text{Subj})) &= f(\text{Ad}) \\
(\beta^\circ_Q = (\text{Transj} \rightarrow \text{Subj})) &= f(U) & (\beta^\circ_Q = (\text{Transj} \rightarrow \text{Subj})) &= f(\text{Abb}) & (\beta^\circ_Q = (\text{Transj} \rightarrow \text{Subj})) &= f(\text{Adj}) \\
(\beta^\circ_Q = (\text{Transj} \rightarrow \text{Subj})) &= f(E) & (\beta^\circ_Q = (\text{Transj} \rightarrow \text{Subj})) &= f(\text{Rep}) & (\beta^\circ_Q = (\text{Transj} \rightarrow \text{Subj})) &= f(\text{Ex})
\end{aligned}$$

#### 2.4.16. $\alpha^\circ\beta^\circ_Q = f(S^*)$

#### 2.4.17. $\alpha^\circ\beta^\circ_Q = f(B)$

#### 2.4.18. $\alpha^\circ\beta^\circ_Q = f(R^*)$

$$\begin{aligned}
(\alpha^\circ\beta^\circ_Q = (\text{Transj} \rightarrow \text{Adj})) &= f(S) & (\alpha^\circ\beta^\circ_Q = (\text{Transj} \rightarrow \text{Adj})) &= f(\text{Sys}) & (\alpha^\circ\beta^\circ_Q = (\text{Transj} \rightarrow \text{Adj})) &= f(\text{Ad}) \\
(\alpha^\circ\beta^\circ_Q = (\text{Transj} \rightarrow \text{Adj})) &= f(U) & (\alpha^\circ\beta^\circ_Q = (\text{Transj} \rightarrow \text{Adj})) &= f(\text{Abb}) & (\alpha^\circ\beta^\circ_Q = (\text{Transj} \rightarrow \text{Adj})) &= f(\text{Adj}) \\
(\alpha^\circ\beta^\circ_Q = (\text{Transj} \rightarrow \text{Adj})) &= f(E) & (\alpha^\circ\beta^\circ_Q = (\text{Transj} \rightarrow \text{Adj})) &= f(\text{Rep}) & (\alpha^\circ\beta^\circ_Q = (\text{Transj} \rightarrow \text{Adj})) &= f(\text{Ex})
\end{aligned}$$

#### 2.4.19. $\text{id}_Q = f(S^*)$

#### 2.4.20. $\text{id}_Q = f(B)$

#### 2.4.21. $\text{id}_Q = f(R^*)$

$$\begin{aligned}
(\text{id}_{Q\text{Adj}} = (\text{Adj} \rightarrow \text{Adj})) &= f(S) & (\text{id}_{Q\text{Adj}} = (\text{Adj} \rightarrow \text{Adj})) &= f(\text{Sys}) & (\text{id}_{Q\text{Adj}} = (\text{Adj} \rightarrow \text{Adj})) &= f(\text{Ad}) \\
(\text{id}_{Q\text{Subj}} = (\text{Subj} \rightarrow \text{Subj})) &= f(U) & (\text{id}_{Q\text{Subj}} = (\text{Subj} \rightarrow \text{Subj})) &= f(\text{Abb}) & (\text{id}_{Q\text{Subj}} = (\text{Subj} \rightarrow \text{Subj})) &= f(\text{Adj}) \\
(\text{id}_{Q\text{Transj}} = (\text{Transj} \rightarrow \text{Transj})) &= f(E) & (\text{id}_{Q\text{Transj}} = (\text{Transj} \rightarrow \text{Transj})) &= f(\text{Rep}) & (\text{id}_{Q\text{Transj}} = (\text{Transj} \rightarrow \text{Transj})) &= f(\text{Ex})
\end{aligned}$$

### 2.5. J-Morphisms

#### 2.5.1. $\alpha_J = f(S^*)$

#### 2.5.2. $\alpha_J = f(B)$

#### 2.5.3. $\alpha_J = f(R^*)$

$$\begin{aligned}
(\alpha_J = (\text{Adjn} \rightarrow \text{Subjn})) &= f(S) & (\alpha_J = (\text{Adjn} \rightarrow \text{Subjn})) &= f(\text{Sys}) & (\alpha_J = (\text{Adjn} \rightarrow \text{Subjn})) &= f(\text{Ad}) \\
(\alpha_J = (\text{Adjn} \rightarrow \text{Subjn})) &= f(U) & (\alpha_J = (\text{Adjn} \rightarrow \text{Subjn})) &= f(\text{Abb}) & (\alpha_J = (\text{Adjn} \rightarrow \text{Subjn})) &= f(\text{Adj})
\end{aligned}$$

$$(\alpha_J = (\text{Adjn} \rightarrow \text{Subjn})) = f(E) \quad (\alpha_J = (\text{Adjn} \rightarrow \text{Subjn})) = f(\text{Rep}) \quad (\alpha_J = (\text{Adjn} \rightarrow \text{Subjn})) = f(\text{Ex})$$

$$\mathbf{2.5.4. \beta_J = f(S^*)}$$

$$\mathbf{2.5.5. \beta_J = f(B)}$$

$$\mathbf{2.5.6. \beta_J = f(R^*)}$$

$$(\beta_J = (\text{Subjn} \rightarrow \text{Transjn})) = f(S) \quad (\beta_J = (\text{Subjn} \rightarrow \text{Transjn})) = f(\text{Sys}) \quad (\beta_J = (\text{Subjn} \rightarrow \text{Transjn})) = f(\text{Ad})$$

$$(\beta_J = (\text{Subjn} \rightarrow \text{Transjn})) = f(U) \quad (\beta_J = (\text{Subjn} \rightarrow \text{Transjn})) = f(\text{Abb}) \quad (\beta_J = (\text{Subjn} \rightarrow \text{Transjn})) = f(\text{Adj})$$

$$(\beta_J = (\text{Subjn} \rightarrow \text{Transjn})) = f(E) \quad (\beta_J = (\text{Subjn} \rightarrow \text{Transjn})) = f(\text{Rep}) \quad (\beta_J = (\text{Subjn} \rightarrow \text{Transjn})) = f(\text{Ex})$$

$$\mathbf{2.5.7. \beta\alpha_J = f(S^*)}$$

$$\mathbf{2.5.8. \beta\alpha_J = f(B)}$$

$$\mathbf{2.5.9. \beta\alpha_J = f(R^*)}$$

$$(\beta\alpha_J = (\text{Adjn} \rightarrow \text{Transjn})) = f(S) \quad (\beta\alpha_J = (\text{Adjn} \rightarrow \text{Transjn})) = f(\text{Sys}) \quad (\beta\alpha_J = (\text{Adjn} \rightarrow \text{Transjn})) = f(\text{Ad})$$

$$(\beta\alpha_J = (\text{Adjn} \rightarrow \text{Transjn})) = f(U) \quad (\beta\alpha_J = (\text{Adjn} \rightarrow \text{Transjn})) = f(\text{Abb}) \quad (\beta\alpha_J = (\text{Adjn} \rightarrow \text{Transjn})) = f(\text{Adj})$$

$$(\beta\alpha_J = (\text{Adjn} \rightarrow \text{Transjn})) = f(E) \quad (\beta\alpha_J = (\text{Adjn} \rightarrow \text{Transjn})) = f(\text{Rep}) \quad (\beta\alpha_J = (\text{Adjn} \rightarrow \text{Transjn})) = f(\text{Ex})$$

$$\mathbf{2.5.10. \alpha^\circ_J = f(S^*)}$$

$$\mathbf{2.5.11. \alpha^\circ_J = f(B)}$$

$$\mathbf{2.5.12. \alpha^\circ_J = f(R^*)}$$

$$(\alpha^\circ_J = (\text{Subjn} \rightarrow \text{Adjn})) = f(S) \quad (\alpha^\circ_J = (\text{Subjn} \rightarrow \text{Adjn})) = f(\text{Sys}) \quad (\alpha^\circ_J = (\text{Subjn} \rightarrow \text{Adjn})) = f(\text{Ad})$$

$$(\alpha^\circ_J = (\text{Subjn} \rightarrow \text{Adjn})) = f(U) \quad (\alpha^\circ_J = (\text{Subjn} \rightarrow \text{Adjn})) = f(\text{Abb}) \quad (\alpha^\circ_J = (\text{Subjn} \rightarrow \text{Adjn})) = f(\text{Adj})$$

$$(\alpha^\circ_J = (\text{Subjn} \rightarrow \text{Adjn})) = f(E) \quad (\alpha^\circ_J = (\text{Subjn} \rightarrow \text{Adjn})) = f(\text{Rep}) \quad (\alpha^\circ_J = (\text{Subjn} \rightarrow \text{Adjn})) = f(\text{Ex})$$

$$\mathbf{2.5.13. \beta^\circ_J = f(S^*)}$$

$$\mathbf{2.5.14. \beta^\circ_J = f(B)}$$

$$\mathbf{2.5.15. \beta^\circ_J = f(R^*)}$$

$$(\beta^\circ_J = (\text{Transjn} \rightarrow \text{Subjn})) = f(S) \quad (\beta^\circ_J = (\text{Transjn} \rightarrow \text{Subjn})) = f(\text{Sys}) \quad (\beta^\circ_J = (\text{Transjn} \rightarrow \text{Subjn})) = f(\text{Ad})$$

$$(\beta^\circ_J = (\text{Transjn} \rightarrow \text{Subjn})) = f(U) \quad (\beta^\circ_J = (\text{Transjn} \rightarrow \text{Subjn})) = f(\text{Abb}) \quad (\beta^\circ_J = (\text{Transjn} \rightarrow \text{Subjn})) = f(\text{Adj})$$

$$(\beta^\circ_J = (\text{Transjn} \rightarrow \text{Subjn})) = f(E) \quad (\beta^\circ_J = (\text{Transjn} \rightarrow \text{Subjn})) = f(\text{Rep}) \quad (\beta^\circ_J = (\text{Transjn} \rightarrow \text{Subjn})) = f(\text{Ex})$$

$$\mathbf{2.5.16. \alpha^\circ\beta^\circ_J = f(S^*)}$$

$$\mathbf{2.5.17. \alpha^\circ\beta^\circ_J = f(B)}$$

$$\mathbf{2.5.18. \alpha^\circ\beta^\circ_J = f(R^*)}$$

$$(\alpha^\circ\beta^\circ_J = (\text{Transjn} \rightarrow \text{Adjn})) = f(S) \quad (\alpha^\circ\beta^\circ_J = (\text{Transjn} \rightarrow \text{Adjn})) = f(\text{Sys}) \quad (\alpha^\circ\beta^\circ_J = (\text{Transjn} \rightarrow \text{Adjn})) = f(\text{Ad})$$

$$(\alpha^\circ\beta^\circ_J = (\text{Transjn} \rightarrow \text{Adjn})) = f(U) \quad (\alpha^\circ\beta^\circ_J = (\text{Transjn} \rightarrow \text{Adjn})) = f(\text{Abb}) \quad (\alpha^\circ\beta^\circ_J = (\text{Transjn} \rightarrow \text{Adjn})) = f(\text{Adj})$$

$$(\alpha^\circ \beta^\circ_J = (\text{Transjn} \rightarrow \text{Adjn})) = f(E) (\alpha^\circ \beta^\circ_J = (\text{Transjn} \rightarrow \text{Adjn})) = f(\text{Rep}) (\alpha^\circ \beta^\circ_J = (\text{Transjn} \rightarrow \text{Adjn})) = f(E_x)$$

### 2.5.19. $\text{id}_J = f(S^*)$

### 2.5.20. $\text{id}_J = f(B)$

### 2.5.21. $\text{id}_J = f(R^*)$

$$\begin{aligned} (\text{id}_{J_{\text{Adjn}}} = (\text{Sub} \rightarrow \text{Sub})) &= f(S) & (\text{id}_{J_{\text{Adjn}}} = (\text{Sub} \rightarrow \text{Sub})) &= f(\text{Sys}) & (\text{id}_{J_{\text{Adjn}}} = (\text{Sub} \rightarrow \text{Sub})) &= f(\text{Ad}) \\ (\text{id}_{J_{\text{Subjn}}} = (\text{Koo} \rightarrow \text{Koo})) &= f(U) & (\text{id}_{J_{\text{Subjn}}} = (\text{Koo} \rightarrow \text{Koo})) &= f(\text{Abb}) & (\text{id}_{J_{\text{Subjn}}} = (\text{Koo} \rightarrow \text{Koo})) &= f(\text{Adj}) \\ (\text{id}_{J_{\text{Transjn}}} = (\text{Sup} \rightarrow \text{Sup})) &= f(E) & (\text{id}_{J_{\text{Transjn}}} = (\text{Sup} \rightarrow \text{Sup})) &= f(\text{Rep}) & (\text{id}_{J_{\text{Transjn}}} = (\text{Sup} \rightarrow \text{Sup})) &= f(E_x) \end{aligned}$$

3. Im vorliegenden Kapitel wird aus dem obigen vollständigen System die ontische Tripelrelation 2.4.6. durch ontische Modelle illustriert.

### 2.4.4. $\beta_Q = f(S^*)$

### 2.4.5. $\beta_Q = f(B)$

### 2.4.6. $\beta_Q = f(R^*)$

$$\begin{aligned} (\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(S) & (\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Sys}) & (\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Ad}) \\ (\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(U) & (\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Abb}) & (\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Adj}) \\ (\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(E) & (\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(\text{Rep}) & (\beta_Q = (\text{Subj} \rightarrow \text{Transj})) &= f(E_x) \end{aligned}$$

$$3.1 \ (\beta_Q = (\text{Subj} \rightarrow \text{Transj})) = f(\text{Ad})$$



Rue du Colonel Driant, Paris

3.2 ( $\beta_Q = (\text{Subj} \rightarrow \text{Transj})) = f(\text{Adj})$ )



Rue de la Mare, Paris

3.3. ( $\beta_Q = (\text{Subj} \rightarrow \text{Transj})) = f(\text{Ex})$ )



Rue Faidherbe, Paris



#### **4. Literatur**

Toth, Alfred, Objekttheoretische Invarianten. In: Electronic Journal for Mathematical Semiotics, 2013

Toth, Alfred, Grammatik der Stadt Paris. 2 Bde. Tucson 2016a

Toth, Alfred, Grundlagen einer Modelltheorie der Ontik I-LVII. In: Electronic Journal for Mathematical Semiotics, 2016b

Toth, Alfred, Grundlegung einer ontischen Kategorientheorie. In: Electronic Journal for Mathematical Semiotics, 2017

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