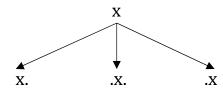
# Prof. Dr. Alfred Toth

# Topologie der semiotischen Nullheit

#### 1. Eine Peirce-Zahl P

$$P = (x_0, x_0, x_0) \text{ mit } x \in (1, 2, 3)$$

ist eine topologische Ausdifferenzierung eines Primzeichens (vgl. Bense 1980; Toth 2025a):



Für Peirce-Zahlen gelten folgende Regeln (vgl. Toth 2025b):

arithmetische P topologische P

$$x. + y. = (x.y.) \qquad (x_A y_A)$$

$$x. + .y = (x..y) = (x.y)$$
 (x<sub>A</sub>y<sub>I</sub>)

$$.x + y. = (.xy.)$$
 (x<sub>I</sub>y<sub>A</sub>)

$$.x + .y = (.x.y)$$
  $(x_1y_1)$ 

Die Abbildung der arithmetischen P auf die topologischen P ist rechtsmehrdeutig, wenn man die letzteren als PC-Relationen (vgl. Toth 2025b) notiert:

$$(x.y.) = (x_A y_A) = ((x/\Box, y/\Box), (\Box \backslash x, \Box \backslash y), (x/\Box, \Box \backslash y), (\Box \backslash x, y/\Box))$$

$$(x.y) = (x_Ay_I) = ((x/\Box, \Box/y), (\Box \setminus x, y \setminus \Box), (x/\Box, y \setminus \Box), (\Box \setminus x, \Box/y))$$

$$(.xy.) = (x_1y_A) = ((\Box/x, y/\Box), (\Box \backslash x, y \backslash \Box), (\Box/x, y \backslash \Box), (\Box \backslash x, \Box/y))$$

$$(.x.y) = (x_i.y_i) = ((\Box/x, \Box/y_i), (x \setminus \Box, y \setminus \Box), (\Box/x, y \setminus \Box), (x \setminus \Box, \Box/x))$$

2. Semiotische Nullheit wurde von Bense wie folg definiert: "Das zu einem Mittel M (einer Zeichenrelation) disponible (vorthetische) Objekt (0°) kann als 0-stellige, vor-semiotische Relation mit der Relationszahl 0 aufgefaßt werden" (Bense 1975, S. 44).

Damit haben wir

arithmetische P topologische P

$$0. + 0. = (0.0.)$$
  $(0_A 0_A) = (\Box_A \Box_A)$ 

$$0. + .0 = (0..0) = (0.0)$$
  $(0_A 0_I) = (\Box_A \Box_I)$ 

$$(0_10_A) = (0.00.)$$

$$(0_10_1) = (0.0)$$
  $(0_10_1) = (0_10_1).$ 

Damit läßt sich die semiotische Nullheit als Geviert von Paaren von PC-Relationen definieren:

$$0:=((\bigcirc_A/\bigcirc_I,\bigcirc_I/\bigcirc_A),(\bigcirc_A\backslash\bigcirc_I,\bigcirc_I\backslash\bigcirc_A),(\bigcirc_A/\bigcirc_I,\bigcirc_I\backslash\bigcirc_A),(\bigcirc_A\backslash\bigcirc_I,\bigcirc_I/\bigcirc_A)).$$

Da die Nullheit nicht als "Nichts" oder absolute Leere, sondern als vorthetische, disponible Relation eingeführt ist, vereinbaren wir im Anschluß an Bense (1975, S. 45)

- $\Box := M^0$
- $\triangle := 0^0$
- $\diamondsuit := \mathsf{M}^0$ .

Wir erhalten damit folgendes Totalsystem ternärer nullheitlicher semiotischer Relationen als Abbildungen von PC-Relationen:

- $\square^A \rightarrow \triangle^A \circ \triangle^A \rightarrow \Diamond^A$
- $\square^A \rightarrow \triangle^A \circ \triangle^A \rightarrow \lozenge^I$
- $\square^{A} \ \rightarrow \ \triangle^{A} \ \circ \ \triangle^{I} \ \rightarrow \ \diamondsuit^{A}$
- $\square^A \ \rightarrow \ \triangle^A \ \circ \ \triangle^I \ \rightarrow \ \diamondsuit^I$
- $\square^{A} \ \rightarrow \ \triangle^{A} \ \circ \ \triangle^{A} \ \leftarrow \ \diamondsuit^{A}$
- $\square^A \ \rightarrow \ \triangle^A \ \circ \ \triangle^A \ \leftarrow \ \diamondsuit^I$
- $\square^{A} \ \rightarrow \ \triangle^{A} \ \circ \ \triangle^{I} \ \leftarrow \ \diamondsuit^{A}$
- $\square^{A} \ \rightarrow \ \triangle^{A} \ \circ \ \triangle^{I} \ \leftarrow \ \diamondsuit^{I}$
- $\square^{A} \ \rightarrow \ \triangle^{A} \ \circ \ \diamondsuit^{A} \ \rightarrow \ \triangle^{A}$
- $\square^A \ \rightarrow \ \triangle^A \ \circ \ \diamondsuit^A \ \rightarrow \ \triangle^I$
- $\square^A \ \rightarrow \ \triangle^A \ \circ \ \diamondsuit^I \ \rightarrow \ \triangle^A$
- $\square^A \ \rightarrow \ \triangle^A \ \circ \ \diamondsuit^I \ \rightarrow \ \triangle^I$
- $\square^{A} \ \rightarrow \ \triangle^{A} \ \circ \ \diamondsuit^{A} \ \leftarrow \ \triangle^{A}$
- $\Box^{A} \rightarrow \triangle^{A} \circ \Diamond^{A} \leftarrow \triangle^{I}$
- $\square^A \rightarrow \triangle^A \circ \Diamond^I \leftarrow \triangle^A$
- $\square^A \ \rightarrow \ \triangle^A \ \circ \ \diamondsuit^I \ \leftarrow \ \triangle^I$

$$\square^A \ \rightarrow \ \triangle^I \ \circ \ \triangle^A \ \rightarrow \ \diamondsuit^A$$

$$\square^A \ \rightarrow \ \triangle^I \ \circ \ \triangle^A \ \rightarrow \ \diamondsuit^I$$

$$\ \ \, \bigcap^A \ \ \, \rightarrow \ \ \, \bigwedge^I \ \ \, \circ \ \ \, \bigwedge^I \ \ \, \rightarrow \ \ \, \diamondsuit^A$$

$$\square^A \ \rightarrow \ \triangle^I \ \circ \ \triangle^I \ \rightarrow \ \diamondsuit^I$$

$$\square^A \ \rightarrow \ \triangle^I \ \circ \ \triangle^A \ \leftarrow \ \diamondsuit^A$$

$$\square^A \ \rightarrow \ \triangle^I \ \circ \ \triangle^A \ \leftarrow \ \diamondsuit^I$$

$$\square^{A} \ \rightarrow \ \triangle^{I} \ \circ \ \triangle^{I} \ \leftarrow \ \diamondsuit^{A}$$

$$\square^A \ \rightarrow \ \triangle^I \ \circ \ \triangle^I \ \leftarrow \ \diamondsuit^I$$

$$\square^A \ \rightarrow \ \triangle^I \ \circ \ \diamondsuit^A \ \rightarrow \ \triangle^A$$

$$\square^A \ \rightarrow \ \triangle^I \ \circ \ \diamondsuit^A \ \rightarrow \ \triangle^I$$

$$\square^A \ \rightarrow \ \triangle^I \ \circ \ \diamondsuit^I \ \rightarrow \ \triangle^A$$

$$\square^A \ \rightarrow \ \triangle^I \ \circ \ \diamondsuit^I \ \rightarrow \ \triangle^I$$

$$\square^A \ \rightarrow \ \triangle^I \ \circ \ \diamondsuit^A \ \leftarrow \ \triangle^A$$

$$\square^{A} \ \rightarrow \ \triangle^{I} \ \circ \ \diamondsuit^{A} \ \leftarrow \ \triangle^{I}$$

$$\square^A \ \rightarrow \ \triangle^I \ \circ \ \diamondsuit^I \ \leftarrow \ \triangle^A$$

$$\square^{A} \ \rightarrow \ \triangle^{I} \ \circ \ \diamondsuit^{I} \ \leftarrow \ \triangle^{I}$$

$$\square^I \ \rightarrow \ \triangle^A \ \circ \ \triangle^A \ \rightarrow \ \diamondsuit^A$$

$$\square^I \ \rightarrow \ \triangle^A \ \circ \ \triangle^I \ \rightarrow \ \diamondsuit^A$$

$$\square^I \ \rightarrow \ \triangle^A \ \circ \ \triangle^I \ \rightarrow \ \diamondsuit^I$$

$$\square^I \ \rightarrow \ \triangle^A \ \circ \ \triangle^A \ \leftarrow \ \diamondsuit^A$$

$$\Box^{\text{I}} \ \rightarrow \ \triangle^{\text{A}} \ \circ \ \triangle^{\text{A}} \ \leftarrow \ \diamondsuit^{\text{I}}$$

$$\square^I \ \rightarrow \ \triangle^A \ \circ \ \triangle^I \ \leftarrow \ \diamondsuit^I$$

- $\square^I \quad \rightarrow \quad \triangle^A \quad \circ \quad \quad \diamondsuit^A \quad \rightarrow \quad \triangle^I$
- $\square^I \ \rightarrow \ \triangle^A \ \circ \ \diamondsuit^I \ \rightarrow \ \triangle^A$
- $\square^I \ \rightarrow \ \triangle^A \ \circ \ \diamondsuit^I \ \rightarrow \ \triangle^I$
- $\Box^{\text{I}} \ \rightarrow \ \bigtriangleup^{\text{A}} \ \circ \ \diamondsuit^{\text{A}} \ \leftarrow \ \bigtriangleup^{\text{A}}$
- $\square^I \ \rightarrow \ \triangle^A \ \circ \ \diamondsuit^A \ \leftarrow \ \triangle^I$
- $\Box^{\text{I}} \ \rightarrow \ \bigtriangleup^{\text{A}} \ \circ \ \diamondsuit^{\text{I}} \ \leftarrow \ \bigtriangleup^{\text{A}}$
- $\square^I \ \rightarrow \ \triangle^A \ \circ \ \diamondsuit^I \ \leftarrow \ \triangle^I$

- $\ \, \bigcap^I \ \ \, \rightarrow \ \ \, \bigwedge^I \ \ \, \circ \ \ \, \bigwedge^A \ \ \, \rightarrow \ \ \, \diamondsuit^A$

- $\square_I \ \rightarrow \ \triangledown_I \ \circ \ \triangledown_I \ \rightarrow \ \diamondsuit_I$
- $\Box^{I} \ \rightarrow \ \triangle^{I} \ \circ \ \triangle^{A} \ \leftarrow \ \diamondsuit^{I}$
- $\square_I \ \rightarrow \ \square_I \ \circ \ \square_I \ \leftarrow \ \lozenge_I$
- $\square^I \ \rightarrow \ \triangle^I \ \circ \ \diamondsuit^A \ \rightarrow \ \triangle^I$
- $\square_I \ \rightarrow \ \square_I \ \circ \ \square_I \ \rightarrow \ \square_I$
- $\square^I \ \rightarrow \ \triangle^I \ \circ \ \diamondsuit^A \ \leftarrow \ \triangle^A$
- $\square^I \ \rightarrow \ \triangle^I \ \circ \ \diamondsuit^A \ \leftarrow \ \triangle^I$
- $\square_I \ \rightarrow \ \square_I \ \circ \ \square_I \ \leftarrow \ \square_I$

---

---

 $\Box^{A} \leftarrow \triangle^{A} \circ \triangle^{A} \rightarrow \Diamond^{A}$ 

- $\square^A \ \leftarrow \ \triangle^A \ \circ \ \triangle^A \ \rightarrow \ \diamondsuit^I$
- $\square^A \ \leftarrow \ \triangle^A \ \circ \ \triangle^I \ \rightarrow \ \diamondsuit^A$
- $\square^A \ \leftarrow \ \triangle^A \ \circ \ \triangle^I \ \rightarrow \ \diamondsuit^I$
- $\square^A \ \leftarrow \ \triangle^A \ \circ \ \triangle^A \ \leftarrow \ \diamondsuit^A$
- $\square^{A} \ \leftarrow \ \triangle^{A} \ \circ \ \triangle^{A} \ \leftarrow \ \diamondsuit^{I}$
- $\square^A \ \leftarrow \ \triangle^A \ \circ \ \triangle^I \ \leftarrow \ \diamondsuit^A$
- $\square^{A} \ \leftarrow \ \triangle^{A} \ \circ \ \triangle^{I} \ \leftarrow \ \diamondsuit^{I}$
- $\square^{A} \ \leftarrow \ \triangle^{A} \ \circ \ \diamondsuit^{A} \ \rightarrow \ \triangle^{A}$
- $\square^A \ \leftarrow \ \triangle^A \ \circ \ \diamondsuit^A \ \rightarrow \ \triangle^I$
- $\square^{A} \leftarrow \triangle^{A} \circ \Diamond^{I} \rightarrow \triangle^{A}$
- $\ \ \, \bigcap^A \ \leftarrow \ \ \, \triangle^A \ \ \, \circ \ \ \, \diamondsuit^I \ \ \, \to \ \ \, \triangle^I$
- $\square^A \ \leftarrow \ \triangle^A \ \circ \ \diamondsuit^A \ \leftarrow \ \triangle^A$
- $\square^{A} \ \leftarrow \ \triangle^{A} \ \circ \ \diamondsuit^{A} \ \leftarrow \ \triangle^{I}$
- $\square^{A} \ \leftarrow \ \triangle^{A} \ \circ \ \diamondsuit^{I} \ \leftarrow \ \triangle^{A}$
- $\square^{A} \ \leftarrow \ \triangle^{A} \ \circ \ \diamondsuit^{I} \ \leftarrow \ \triangle^{I}$

- $\square^A \leftarrow \triangle^I \circ \triangle^A \rightarrow \Diamond^A$
- $\square^A \ \leftarrow \ \triangle^I \ \circ \ \triangle^A \ \rightarrow \ \diamondsuit^I$
- $\square^A \leftarrow \triangle^I \circ \triangle^I \rightarrow \Diamond^A$
- $\square^A \ \leftarrow \ \triangle^I \ \circ \ \triangle^I \ \rightarrow \ \diamondsuit^I$
- $\square^A \ \leftarrow \ \triangle^I \ \circ \ \triangle^A \ \leftarrow \ \diamondsuit^A$
- $\square^A \ \leftarrow \ \triangle^I \ \circ \ \triangle^A \ \leftarrow \ \diamondsuit^I$
- $\square^A \ \leftarrow \ \triangle^I \ \circ \ \triangle^I \ \leftarrow \ \diamondsuit^A$
- $\square^A \ \leftarrow \ \triangle^I \ \circ \ \triangle^I \ \leftarrow \ \diamondsuit^I$
- $\square^A \ \leftarrow \ \triangle^I \ \circ \ \diamondsuit^A \ \rightarrow \ \triangle^A$
- $\square^A \ \leftarrow \ \triangle^I \ \circ \ \diamondsuit^A \ \rightarrow \ \triangle^I$
- $\square^A \ \leftarrow \quad \triangle^I \quad \circ \quad \quad \diamondsuit^I \quad \rightarrow \quad \triangle^A$

- $\square^A \ \leftarrow \ \triangle^I \ \circ \ \diamondsuit^I \ \rightarrow \ \triangle^I$
- $\square^{A} \ \leftarrow \quad \triangle^{I} \quad \circ \quad \quad \diamondsuit^{A} \ \leftarrow \quad \triangle^{A}$
- $\square^A \ \leftarrow \ \triangle^I \ \circ \ \diamondsuit^A \ \leftarrow \ \triangle^I$
- $\square^{A} \ \leftarrow \ \triangle^{I} \ \circ \ \diamondsuit^{I} \ \leftarrow \ \triangle^{A}$
- $\square^A \ \leftarrow \ \triangle^I \ \circ \ \diamondsuit^I \ \leftarrow \ \triangle^I$
- ---
- $\Box^{\text{I}} \leftarrow \triangle^{\text{A}} \circ \triangle^{\text{A}} \rightarrow \Diamond^{\text{A}}$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{A} \ \circ \ \bigtriangleup^{A} \ \rightarrow \ \diamondsuit^{I}$
- $\ \, \bigcap^{I} \ \ \, \leftarrow \ \ \, \triangle^{A} \ \ \, \circ \ \ \, \triangle^{I} \ \ \, \rightarrow \ \ \, \diamondsuit^{A}$
- $\square_I \ \leftarrow \ \triangle_V \ \circ \ \triangle_I \ \rightarrow \ \diamondsuit_I$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{A} \ \circ \ \bigtriangleup^{A} \ \leftarrow \ \diamondsuit^{A}$
- $\Box^{I} \ \leftarrow \ \triangle^{A} \ \circ \ \triangle^{A} \ \leftarrow \ \diamondsuit^{I}$
- $\Box^{\text{I}} \leftarrow \triangle^{\text{A}} \circ \triangle^{\text{I}} \leftarrow \Diamond^{\text{A}}$
- $\Box^{I} \ \leftarrow \ \triangle^{A} \ \circ \ \triangle^{I} \ \leftarrow \ \diamondsuit^{I}$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{A} \ \circ \ \diamondsuit^{A} \ \rightarrow \ \bigtriangleup^{A}$
- $\square^I \ \leftarrow \ \triangle^A \ \circ \ \diamondsuit^A \ \rightarrow \ \triangle^I$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{A} \ \circ \ \diamondsuit^{I} \ \rightarrow \ \bigtriangleup^{A}$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{A} \ \circ \ \diamondsuit^{I} \ \rightarrow \ \bigtriangleup^{I}$
- $\Box^{\text{I}} \ \leftarrow \ \triangle^{\text{A}} \ \circ \ \diamondsuit^{\text{A}} \ \leftarrow \ \triangle^{\text{A}}$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{A} \ \circ \ \diamondsuit^{A} \ \leftarrow \ \bigtriangleup^{I}$
- $\square^I \ \leftarrow \ \triangle^A \ \circ \ \diamondsuit^I \ \leftarrow \ \triangle^A$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{A} \ \circ \ \diamondsuit^{I} \ \leftarrow \ \bigtriangleup^{I}$
- ---
- $\Box^{I} \leftarrow \triangle^{I} \circ \triangle^{A} \rightarrow \Diamond^{A}$
- $\Box^I \ \leftarrow \ \bigtriangleup^I \ \circ \ \bigtriangleup^A \ \rightarrow \ \diamondsuit^I$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{I} \ \circ \ \bigtriangleup^{I} \ \rightarrow \ \diamondsuit^{A}$
- $\square_I \ \leftarrow \ \square_I \ \circ \ \square_I \ \rightarrow \ \lozenge_I$

- $\Box^{I} \ \leftarrow \ \bigtriangleup^{I} \ \circ \ \bigtriangleup^{A} \ \leftarrow \ \diamondsuit^{A}$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{I} \ \circ \ \bigtriangleup^{A} \ \leftarrow \ \diamondsuit^{I}$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{I} \ \circ \ \bigtriangleup^{I} \ \leftarrow \ \diamondsuit^{A}$
- $\Box_{\rm I} \ \leftarrow \ \Box_{\rm I} \ \circ \ \Box_{\rm I} \ \leftarrow \ \Diamond_{\rm I}$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{I} \ \circ \ \diamondsuit^{A} \ \rightarrow \ \bigtriangleup^{A}$
- $\square^I \ \leftarrow \ \triangle^I \ \circ \ \diamondsuit^A \ \rightarrow \ \triangle^I$
- $\square^I \ \leftarrow \ \triangle^I \ \circ \ \diamondsuit^I \ \rightarrow \ \triangle^A$
- $\square_I \ \leftarrow \ \square_I \ \circ \ \square_I \ \rightarrow \ \square_I$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{I} \ \circ \ \diamondsuit^{A} \ \leftarrow \ \bigtriangleup^{I}$
- $\Box^{I} \ \leftarrow \ \bigtriangleup^{I} \ \circ \ \diamondsuit^{I} \ \leftarrow \ \bigtriangleup^{A}$
- $\square_I \ \leftarrow \ \square_I \ \circ \ \square_I \ \leftarrow \ \square_I$

---

- $\triangle^{A} \ \rightarrow \ \square^{A} \ \circ \ \triangle^{A} \ \rightarrow \ \diamondsuit^{A}$
- $\triangle^{A} \ \rightarrow \ \square^{A} \ \circ \ \triangle^{A} \ \rightarrow \ \diamondsuit^{I}$
- $\triangle^A \ \rightarrow \ \square^A \ \circ \ \triangle^I \ \rightarrow \ \diamondsuit^A$
- $\triangle^A \ \rightarrow \ \square^A \ \circ \ \triangle^I \ \rightarrow \ \diamondsuit^I$
- $\triangle^{A} \ \rightarrow \ \square^{A} \ \circ \ \triangle^{A} \ \leftarrow \ \diamondsuit^{A}$
- $\triangle^{A} \ \rightarrow \ \square^{A} \ \circ \ \triangle^{A} \ \leftarrow \ \diamondsuit^{I}$
- $\triangle^{A} \ \rightarrow \ \square^{A} \ \circ \ \triangle^{I} \ \leftarrow \ \diamondsuit^{A}$
- $\triangle^{A} \ \rightarrow \ \square^{A} \ \circ \ \triangle^{I} \ \leftarrow \ \diamondsuit^{I}$
- $\triangle^{A}$   $\rightarrow$   $\square^{A}$   $\circ$   $\diamondsuit^{A}$   $\rightarrow$   $\triangle^{A}$
- $\triangle^{A}$   $\rightarrow$   $\square^{A}$   $\circ$   $\diamondsuit^{A}$   $\rightarrow$   $\triangle^{I}$
- $\triangle^{A} \ \rightarrow \ \square^{A} \ \circ \ \diamondsuit^{I} \ \rightarrow \ \triangle^{A}$
- $\triangle^{A} \ \rightarrow \ \square^{A} \ \circ \ \diamondsuit^{I} \ \rightarrow \ \triangle^{I}$

- $\triangle^{A}$   $\rightarrow$   $\square^{A}$   $\circ$   $\diamondsuit^{A}$   $\leftarrow$   $\triangle^{A}$
- $\triangle^{A}$   $\rightarrow$   $\square^{A}$   $\circ$   $\diamondsuit^{A}$   $\leftarrow$   $\triangle^{I}$
- $\triangle^{A}$   $\rightarrow$   $\square^{A}$   $\circ$   $\Diamond^{I}$   $\leftarrow$   $\triangle^{A}$
- $\triangle^{A} \ \rightarrow \ \square^{A} \ \circ \ \diamondsuit^{I} \ \leftarrow \ \triangle^{I}$

- $\triangle^{A} \ \rightarrow \ \square^{I} \ \circ \ \triangle^{A} \ \rightarrow \ \diamondsuit^{A}$
- $\triangle^{A} \ \rightarrow \ \square^{I} \ \circ \ \triangle^{A} \ \rightarrow \ \diamondsuit^{I}$
- $\triangle^{A} \ \rightarrow \ \square^{I} \ \circ \ \triangle^{I} \ \rightarrow \ \diamondsuit^{A}$
- $\triangle^{A} \ \rightarrow \ \square^{I} \ \circ \ \triangle^{I} \ \rightarrow \ \diamondsuit^{I}$
- $\triangle^{A}$   $\rightarrow$   $\square^{I}$   $\circ$   $\triangle^{A}$   $\leftarrow$   $\diamondsuit^{A}$
- $\triangle^{A} \ \rightarrow \quad \Box^{I} \quad \circ \quad \quad \triangle^{A} \ \leftarrow \quad \diamondsuit^{I}$
- $\triangle^{A} \ \rightarrow \ \square^{I} \ \circ \ \triangle^{I} \ \leftarrow \ \diamondsuit^{A}$
- $\triangle^{A} \rightarrow \square^{I} \circ \triangle^{I} \leftarrow \Diamond^{I}$
- $\triangle^{A}$   $\rightarrow$   $\square^{I}$   $\circ$   $\diamondsuit^{A}$   $\rightarrow$   $\triangle^{A}$
- $\triangle^{A} \ \rightarrow \ \square^{I} \ \circ \ \diamondsuit^{A} \ \rightarrow \ \triangle^{I}$
- $\triangle^{A}$   $\rightarrow$   $\square^{I}$   $\circ$   $\diamondsuit^{I}$   $\rightarrow$   $\triangle^{A}$
- $\triangle^{A} \ \rightarrow \ \square^{I} \ \circ \ \diamondsuit^{I} \ \rightarrow \ \triangle^{I}$
- $\triangle^{A} \ \rightarrow \ \square^{I} \ \circ \ \diamondsuit^{A} \ \leftarrow \ \triangle^{A}$
- $\triangle^{A}$   $\rightarrow$   $\square^{I}$   $\circ$   $\diamondsuit^{A}$   $\leftarrow$   $\triangle^{I}$
- $\triangle^{A}$   $\rightarrow$   $\square^{I}$   $\circ$   $\Diamond^{I}$   $\leftarrow$   $\triangle^{A}$
- $\triangle^{A} \ \rightarrow \ \square^{I} \ \circ \ \diamondsuit^{I} \ \leftarrow \ \triangle^{I}$

- $\triangle^{I}$   $\rightarrow$   $\square^{A}$   $\circ$   $\triangle^{A}$   $\rightarrow$   $\diamondsuit^{A}$
- $\triangle^I \quad \rightarrow \quad \ \, \Box^A \quad \circ \quad \ \, \triangle^A \quad \rightarrow \quad \ \, \diamondsuit^I$
- $\triangle^{\text{I}} \rightarrow \square^{\text{A}} \circ \square^{\text{I}} \rightarrow \lozenge^{\text{A}}$
- $\triangle^I \ \rightarrow \ \square^A \ \circ \ \triangle^I \ \rightarrow \ \diamondsuit^I$
- $\triangle^{\text{I}} \rightarrow \Box^{\text{A}} \circ \triangle^{\text{A}} \leftarrow \Diamond^{\text{A}}$

- $\triangle^{I} \ \rightarrow \ \square^{A} \ \circ \ \triangle^{A} \ \leftarrow \ \diamondsuit^{I}$
- $\triangle^{\text{I}} \rightarrow \square^{\text{A}} \circ \triangle^{\text{I}} \leftarrow \Diamond^{\text{A}}$
- $\triangle^{I} \ \rightarrow \ \square^{A} \ \circ \ \triangle^{I} \ \leftarrow \ \diamondsuit^{I}$
- $\triangle^I \quad \rightarrow \quad \square^A \quad \circ \quad \quad \diamondsuit^A \quad \rightarrow \quad \triangle^A$
- $\triangle^{I}$   $\rightarrow$   $\square^{A}$   $\circ$   $\diamondsuit^{A}$   $\rightarrow$   $\triangle^{I}$
- $\triangle^{I}$   $\rightarrow$   $\square^{A}$   $\circ$   $\diamondsuit^{I}$   $\rightarrow$   $\triangle^{A}$
- $\triangle^I$   $\rightarrow$   $\square^A$   $\circ$   $\diamondsuit^I$   $\rightarrow$   $\triangle^I$
- $\triangle^{I} \ \rightarrow \ \square^{A} \ \circ \ \diamondsuit^{A} \ \leftarrow \ \triangle^{A}$
- $\triangle^I \ \rightarrow \ \square^A \ \circ \ \diamondsuit^A \ \leftarrow \ \triangle^I$
- $\triangle^{\text{I}} \rightarrow \square^{\text{A}} \circ \Diamond^{\text{I}} \leftarrow \triangle^{\text{A}}$
- $\triangle^{I} \ \rightarrow \ \square^{A} \ \circ \ \diamondsuit^{I} \ \leftarrow \ \triangle^{I}$

- $\triangle^{I}$   $\rightarrow$   $\square^{I}$   $\circ$   $\triangle^{A}$   $\rightarrow$   $\diamondsuit^{A}$
- $\triangle^I \ \rightarrow \ \square^I \ \circ \ \triangle^A \ \rightarrow \ \diamondsuit^I$
- $\triangle^{I} \ \rightarrow \ \square^{I} \ \circ \ \triangle^{I} \ \rightarrow \ \diamondsuit^{A}$

- $\triangle^I \ \rightarrow \ \square^I \ \circ \ \triangle^A \ \leftarrow \ \diamondsuit^I$
- $\triangle^{I}$   $\rightarrow$   $\bigcirc^{I}$   $\circ$   $\triangle^{I}$   $\leftarrow$   $\diamondsuit^{A}$
- $\triangle^I \quad \rightarrow \quad \ \, \Box^I \quad \circ \quad \ \, \diamondsuit^A \quad \rightarrow \quad \, \triangle^A$
- $\triangle^{I} \ \rightarrow \ \square^{I} \ \circ \ \diamondsuit^{A} \ \rightarrow \ \triangle^{I}$
- $\triangle^I \quad \rightarrow \quad \bigcirc^I \quad \circ \quad \quad \diamondsuit^I \quad \rightarrow \quad \triangle^A$
- $\triangle_I \ \rightarrow \ \square_I \ \circ \ \diamondsuit_I \ \rightarrow \ \bigtriangledown_I$
- $\triangle^{I} \ \rightarrow \ \square^{I} \ \circ \ \diamondsuit^{A} \ \leftarrow \ \triangle^{A}$
- $\triangle^{\text{I}} \rightarrow \square^{\text{I}} \circ \Diamond^{\text{A}} \leftarrow \triangle^{\text{I}}$
- $\triangle^{\text{I}} \rightarrow \square^{\text{I}} \circ \Diamond^{\text{I}} \leftarrow \triangle^{\text{A}}$

ΔI	$\rightarrow$	□I	o	♦I	<b>←</b>	$\Delta^{I}$

$$\triangle^{A} \ \leftarrow \quad \square^{A} \ \circ \quad \triangle^{A} \ \rightarrow \quad \diamondsuit^{A}$$

$$\triangle^{A}$$
  $\leftarrow$   $\square^{A}$   $\circ$   $\triangle^{A}$   $\rightarrow$   $\diamondsuit^{I}$ 

$$\triangle^{A} \leftarrow \square^{A} \circ \triangle^{I} \rightarrow \Diamond^{A}$$

$$\triangle^{A} \leftarrow \square^{A} \circ \triangle^{I} \rightarrow \Diamond^{I}$$

$$\triangle^{A} \leftarrow \square^{A} \circ \triangle^{A} \leftarrow \Diamond^{A}$$

$$\triangle^{A}$$
  $\leftarrow$   $\bigcirc^{A}$   $\circ$   $\triangle^{A}$   $\leftarrow$   $\diamondsuit^{I}$ 

$$\triangle^{A}$$
  $\leftarrow$   $\bigcirc^{A}$   $\circ$   $\triangle^{I}$   $\leftarrow$   $\diamondsuit^{A}$ 

$$\triangle^{A} \leftarrow \square^{A} \circ \triangle^{I} \leftarrow \Diamond^{I}$$

$$\triangle^{A}$$
  $\leftarrow$   $\bigcirc^{A}$   $\circ$   $\diamondsuit^{A}$   $\rightarrow$   $\triangle^{A}$ 

$$\triangle^{A} \leftarrow \square^{A} \circ \Diamond^{A} \rightarrow \triangle^{I}$$

$$\triangle^{A} \leftarrow \square^{A} \circ \Diamond^{I} \rightarrow \triangle^{A}$$

$$\triangle^A \ \leftarrow \ \square^A \ \circ \ \diamondsuit^I \ \rightarrow \ \triangle^I$$

$$\triangle^{A}$$
  $\leftarrow$   $\bigcirc^{A}$   $\circ$   $\diamondsuit^{A}$   $\leftarrow$   $\triangle^{A}$ 

$$\triangle^{A} \ \leftarrow \quad \Box^{A} \ \circ \quad \ \diamondsuit^{A} \ \leftarrow \quad \triangle^{I}$$

$$\triangle^{A}$$
  $\leftarrow$   $\bigcirc^{A}$   $\circ$   $\diamondsuit^{I}$   $\leftarrow$   $\triangle^{A}$ 

$$\triangle^{A} \leftarrow \square^{A} \circ \Diamond^{I} \leftarrow \triangle^{I}$$

$$\triangle^{A} \ \leftarrow \quad \Box^{I} \quad \circ \quad \quad \triangle^{A} \ \rightarrow \quad \diamondsuit^{A}$$

$$\triangle^A \ \leftarrow \quad \Box^I \quad \circ \quad \quad \triangle^A \ \rightarrow \quad \diamondsuit^I$$

$$\triangle^A \ \leftarrow \quad \Box^I \quad \circ \quad \quad \triangle^I \quad \rightarrow \quad \diamondsuit^A$$

$$\triangle^{A} \ \leftarrow \quad \Box^{I} \quad \circ \quad \quad \triangle^{I} \quad \rightarrow \quad \diamondsuit^{I}$$

$$\triangle^{A} \ \leftarrow \quad \Box^{I} \quad \circ \quad \quad \triangle^{A} \ \leftarrow \quad \diamondsuit^{A}$$

$$\triangle^{A} \ \leftarrow \quad \Box^{I} \quad \circ \quad \quad \triangle^{A} \ \leftarrow \quad \diamondsuit^{I}$$

$$\triangle^{A} \leftarrow \square^{I} \circ \triangle^{I} \leftarrow \diamondsuit^{A}$$

 $\triangle^{A} \ \leftarrow \quad \Box^{I} \quad \circ \quad \quad \triangle^{I} \quad \leftarrow \quad \diamondsuit^{I}$ 

 $\triangle^{A} \ \leftarrow \quad \Box^{I} \quad \circ \quad \quad \diamondsuit^{A} \ \rightarrow \quad \triangle^{A}$ 

 $\triangle^{A} \leftarrow \square^{I} \circ \Diamond^{A} \rightarrow \triangle^{I}$ 

 $\triangle^{A} \ \leftarrow \quad \Box^{I} \quad \circ \quad \quad \diamondsuit^{I} \quad \rightarrow \quad \triangle^{A}$ 

 $\triangle^{A} \leftarrow \square^{I} \circ \Diamond^{I} \rightarrow \triangle^{I}$ 

 $\triangle^{A} \leftarrow \square^{I} \circ \Diamond^{A} \leftarrow \triangle^{A}$ 

 $\triangle^{A}$   $\leftarrow$   $\square^{I}$   $\circ$   $\Diamond^{A}$   $\leftarrow$   $\triangle^{I}$ 

 $\triangle^{A} \leftarrow \square^{I} \circ \Diamond^{I} \leftarrow \triangle^{A}$ 

 $\triangle^{A} \leftarrow \square^{I} \circ \Diamond^{I} \leftarrow \triangle^{I}$ 

---

 $\triangle^{I}$   $\leftarrow$   $\bigcirc^{A}$   $\circ$   $\triangle^{A}$   $\rightarrow$   $\diamondsuit^{A}$ 

 $\triangle^{I}$   $\leftarrow$   $\square^{A}$   $\circ$   $\triangle^{A}$   $\rightarrow$   $\diamondsuit^{I}$ 

 $\triangle^{I}$   $\leftarrow$   $\square^{A}$   $\circ$   $\triangle^{I}$   $\rightarrow$   $\diamondsuit^{A}$ 

 $\triangle^I \ \leftarrow \ \square^A \ \circ \ \triangle^I \ \rightarrow \ \diamondsuit^I$ 

 $\triangle^{\text{I}}$   $\leftarrow$   $\bigcirc^{\text{A}}$   $\circ$   $\triangle^{\text{A}}$   $\leftarrow$   $\diamondsuit^{\text{A}}$ 

 $\triangle^{I} \ \leftarrow \ \square^{A} \ \circ \ \triangle^{A} \ \leftarrow \ \diamondsuit^{I}$ 

 $\triangle^{I}$   $\leftarrow$   $\bigcirc^{A}$   $\circ$   $\triangle^{I}$   $\leftarrow$   $\diamondsuit^{A}$ 

 $\triangle^{I} \ \leftarrow \ \square^{A} \ \circ \ \triangle^{I} \ \leftarrow \ \diamondsuit^{I}$ 

 $\triangle^{\text{I}} \leftarrow \square^{\text{A}} \circ \Diamond^{\text{A}} \rightarrow \triangle^{\text{A}}$ 

 $\triangle^{I}$   $\leftarrow$   $\square^{A}$   $\circ$   $\diamondsuit^{A}$   $\rightarrow$   $\triangle^{I}$ 

 $\triangle^{I} \ \leftarrow \ \square^{A} \ \circ \ \diamondsuit^{I} \ \rightarrow \ \triangle^{A}$ 

 $\triangle^{I} \ \leftarrow \ \square^{A} \ \circ \ \diamondsuit^{I} \ \rightarrow \ \triangle^{I}$ 

 $\triangle^{\text{I}} \leftarrow \square^{\text{A}} \circ \Diamond^{\text{A}} \leftarrow \triangle^{\text{A}}$ 

 $\triangle^{\text{I}} \leftarrow \square^{\text{A}} \circ \Diamond^{\text{A}} \leftarrow \triangle^{\text{I}}$ 

 $\triangle^{I} \leftarrow \Box^{A} \circ \Diamond^{I} \leftarrow \triangle^{A}$ 

 $\triangle^{I}$   $\leftarrow$   $\bigcirc^{A}$   $\circ$   $\Diamond^{I}$   $\leftarrow$   $\triangle^{I}$ 

- $\triangle^{\text{I}} \leftarrow \square^{\text{I}} \circ \triangle^{\text{A}} \rightarrow \Diamond^{\text{A}}$
- $\triangle^{I} \leftarrow \square^{I} \circ \triangle^{A} \rightarrow \Diamond^{I}$
- $\triangle^{I} \leftarrow \square^{I} \circ \triangle^{I} \rightarrow \Diamond^{A}$
- $\nabla_{I} \leftarrow \square_{I} \circ \nabla_{I} \rightarrow \Diamond_{I}$
- $\triangle^{I} \leftarrow \square^{I} \circ \triangle^{A} \leftarrow \Diamond^{A}$
- $\triangle^{I}$   $\leftarrow$   $\square^{I}$   $\circ$   $\triangle^{A}$   $\leftarrow$   $\diamondsuit^{I}$
- $\triangle^{I}$   $\leftarrow$   $\bigcirc^{I}$   $\circ$   $\triangle^{I}$   $\leftarrow$   $\diamondsuit^{A}$
- $\triangle^{I} \leftarrow \square^{I} \circ \triangle^{I} \leftarrow \Diamond^{I}$
- $\triangle^{I} \leftarrow \square^{I} \circ \Diamond^{A} \rightarrow \triangle^{A}$
- $\triangle^{I}$   $\leftarrow$   $\bigcirc^{I}$   $\circ$   $\Diamond^{A}$   $\rightarrow$   $\triangle^{I}$
- $\triangle^{I} \leftarrow \square^{I} \circ \Diamond^{I} \rightarrow \triangle^{A}$
- $\triangle_{I} \leftarrow \square_{I} \circ \Diamond_{I} \rightarrow \triangle_{I}$
- $\triangle^{I} \leftarrow \square^{I} \circ \Diamond^{A} \leftarrow \triangle^{A}$
- $\triangle^{I} \leftarrow \square^{I} \circ \Diamond^{A} \leftarrow \triangle^{I}$
- $\triangle^{I} \leftarrow \square^{I} \circ \Diamond^{I} \leftarrow \triangle^{A}$
- $\triangle_{\rm I} \leftarrow \square_{\rm I} \circ \Diamond_{\rm I} \leftarrow \triangle_{\rm I}$

## Literatur

Bense, Max, Semiotische Prozesse und Systeme. Baden-Baden 1975

Bense, Max, Die Einführung der Primzeichen. In: Ars Semeiotica 3/3, 1980, S. 287-294

Toth, Alfred, Topologische Differenzierungen von Peirce-Zahlen. In: Electronic Journal for Mathematical Semiotics, 2025a

Toth, Alfred, Topologische semiotische Matrizen. In: Electronic Journal for Mathematical Semiotics, 2025b

## 3.10.2025