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(1942-2016)

## Title

*Diagrammatik und Komplementarität*

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## Disciplines

Cybernetics, Computer Sciences,

## Abstract

System der Pfeil-Diagramme zur Darstellung der Nicht-Darstellbarkeit von Proömilitat, Chiasmen und Diamonds

System of the arrow diagrams for the representation of the non-representability of prooemics, chiasms and diamonds.

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# Diagrammatik und Komplementarität

## System der Pfeil-Diagramme zur Darstellung der Nicht-Darstellbarkeit von Proömilitat, Chiasmen und Diamonds.

# Ziele der Graphematik

- Formalisierung der Diagrammatik
- Darstellung der Diagramme im Rahmen einer poly-kontexturalen Kategorientheorie
- System-Model-Relation zwischen Diagrammen und Polykategorien

# Komposition von Pfeildiagrammen

- Ein System von drei Grundpfeilen und einer Kompositionsregel
- Pfeil der Ordnung
- Pfeil des Umtausches
- Pfeil der Ähnlichkeit
- Regel der Verknüpfbarkeit von Pfeilen
- Fundierungspfeile

# Pfeil der Ordnung

- Westliche wissenschaftliche Denkform
- Mathematische Kategorientheorie
- Morphismen
- Komposition von Morphismen

# Pfeil des Umtausches

- Dialektik, Polarität, Dynamik
- Grenzen der Formalisierbarkeit
- Paradoxe Formalismen
- Parakonsistente Logiken

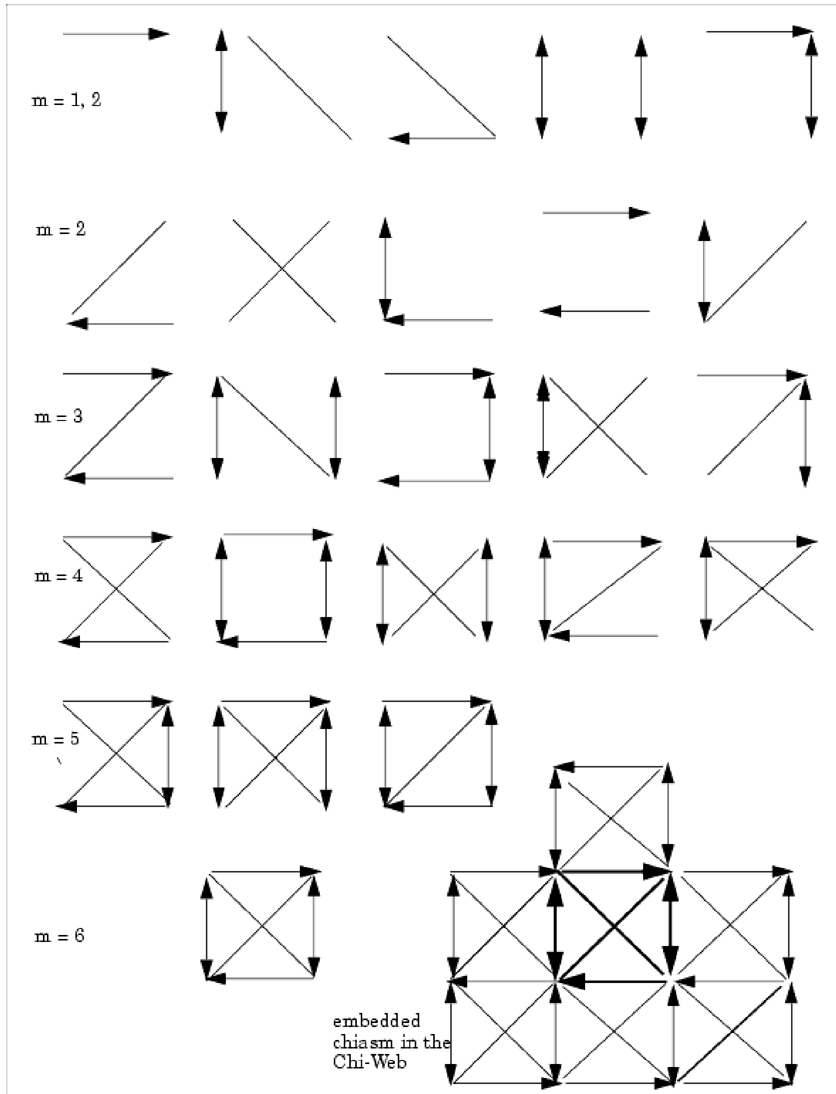
# Pfeil der Ähnlichkeit

- Analogismus
- Nicht operationalisierbar, weil Operator und Operand in ihrer Ähnlichkeit zusammenfallen
- Methode Analogia entis

# Regel der Verknüpfbarkeit

- Matching conditions für lineare Verknüpfung
- Ende eines Pfeils wird mit dem Anfang eines anderen Pfeils verbunden.
- Ein Pfeil kann mit sich selbst verbunden werden.
- Ein Fundierungspfeil hat eine orthogonale Verknüpfung

# Tabelle der Elementarverknüpfungen



# Pfeildiagramme in Matrizen

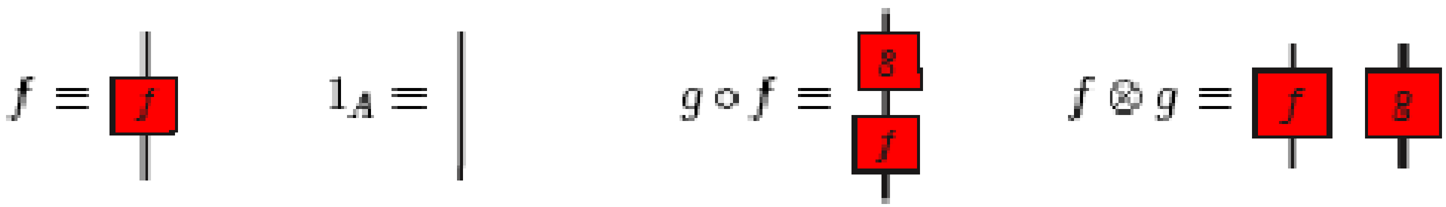
- Verortung von Diagrammen
- Interpretation von Verortungen
- Reflektionalität
- Interaktivität
- Interventionalität
- Metamorphose

# Kategorialisierung von Diagrammen

- Klassische Kategorientheorie der Komposition von Morphismen
- Moderne Kategorientheorie mit Komposition und Yuxtaposition
- Topologische Diagramme
- n-Kategorien

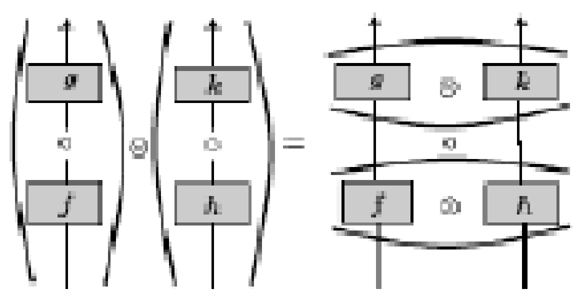
# Diagrammatik von Komposition und Yuxtaposition

- Zuordnungen



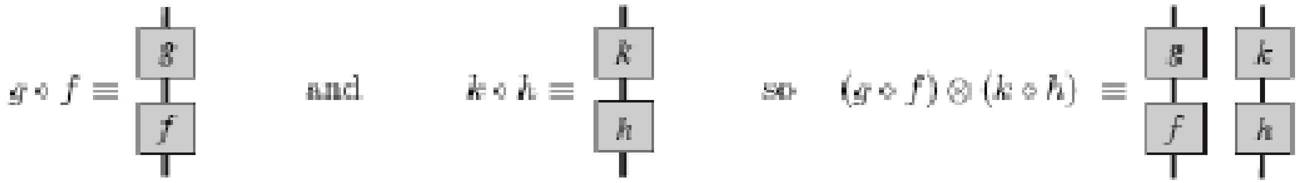

Formulated as an orthogonality of sequentiel and parallel components.

$$\mathrm{par}\left(\mathrm{seq}\left(f_1, g_1\right), \mathrm{seq}\left(f_2, g_2\right)\right) = \mathrm{seq}\left(\mathrm{par}\left(g_1, g_2\right), \mathrm{par}\left(f_1, f_2\right)\right)$$

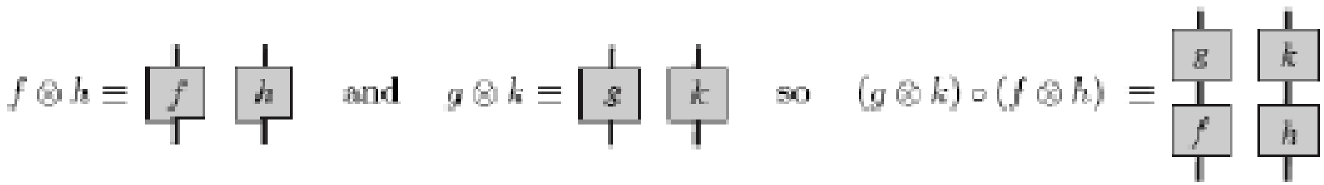


# Komposition und Yuxtaposition

- Verknüpfungen




On the other hand we have:




**Bifunctoriality in category theory with [ ∘ , ⊗ ]**

$$\begin{bmatrix} q_1 & q_2 \\ p_1 & p_2 \end{bmatrix} : \begin{pmatrix} p_1 \\ \otimes \\ p_2 \end{pmatrix} \circ \begin{pmatrix} q_1 \\ \otimes \\ q_2 \end{pmatrix} = \begin{pmatrix} (p_1 \circ q_1) \\ \otimes \\ (p_2 \circ q_2) \end{pmatrix}$$

# Verklammerung

- Klammerdarstellung

Bifunctoriality
Head
Body

$$\begin{bmatrix} [\otimes \circ \otimes] \\ [\circ \otimes \circ] \end{bmatrix}$$

Bifunctoriality
Head
Body

$$\begin{bmatrix} [\otimes \circ \otimes] \\ [\circ \otimes \circ] \end{bmatrix}$$

**Bifunctoriality**

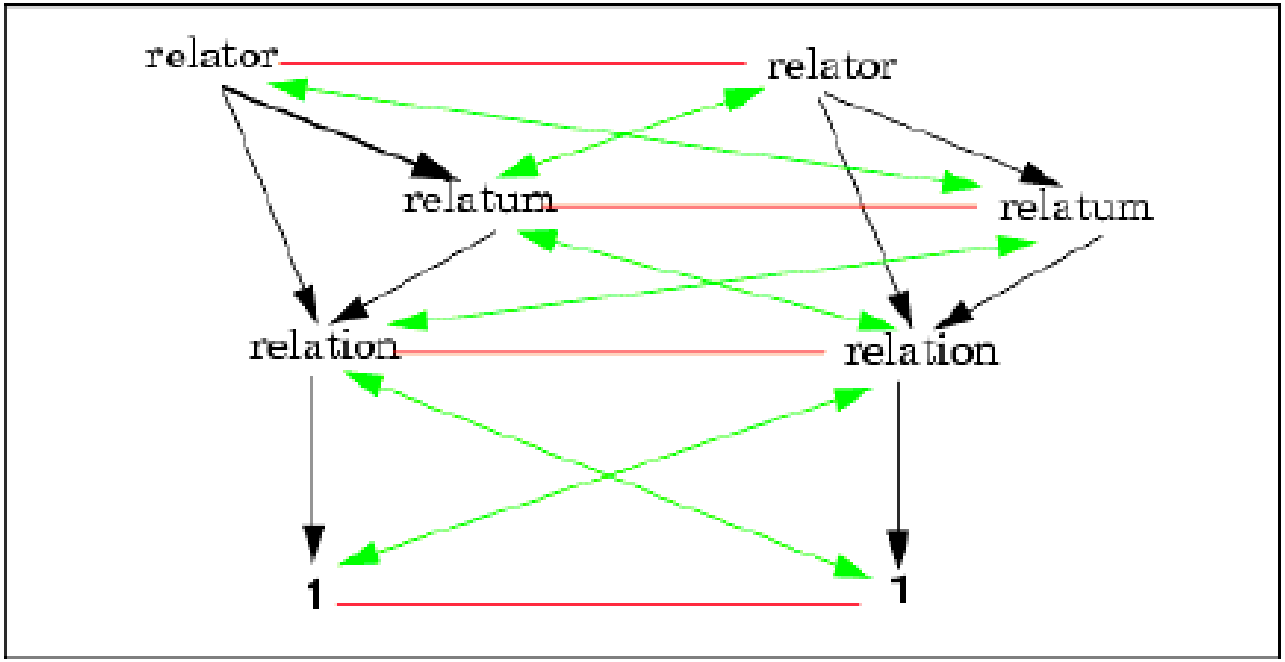
Head: $\begin{bmatrix} q_1 & q_2 \\ p_1 & p_2 \end{bmatrix}$

Body

$$\begin{bmatrix} \begin{pmatrix} p_1 \\ \otimes \\ p_2 \end{pmatrix} \circ \begin{pmatrix} q_1 \\ \otimes \\ q_2 \end{pmatrix} \\ \begin{pmatrix} (p_1 \circ q_1) \\ \otimes \\ (p_2 \circ q_2) \end{pmatrix} \end{bmatrix}$$

# Formalisierung von Diagrammen

- Chiastische Verknüpfung zweier fundierter Systeme



**(RelSyst, Anch) - chiasm :**

$$\begin{pmatrix} \mathcal{U}_2 \\ \mathcal{U}_1 \end{pmatrix}, \left( \begin{matrix} \begin{pmatrix} Rat \\ Rand \\ Rel \end{pmatrix}_1 & \begin{pmatrix} Rat \\ Rand \\ Rel \end{pmatrix}_2 \\ Anch_1 & Anch_2 \end{matrix} \right):$$

$\alpha$. **parallel**, contextural (red ($\amalg$) + black ($\circ$))

$$\begin{pmatrix} Anch_2 \\ \amalg \\ Anch_1 \end{pmatrix} \circ \left( \begin{matrix} \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_2 \\ \amalg \\ \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_1 \end{matrix} \right) = \left( \begin{matrix} Anch_2 & \circ & \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_2 \\ & \amalg & \\ Anch_1 & \circ & \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_1 \end{matrix} \right)$$

$\beta$. **chiasm** (green ($\Diamond$) + red ($\amalg$))

$$\begin{pmatrix} Anch_2 \\ \amalg \\ Anch_1 \end{pmatrix} \Diamond \left( \begin{matrix} \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_2 \\ \amalg \\ \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_1 \end{matrix} \right) = \left( \begin{matrix} Anch_2 & \Diamond & \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_2 \\ & \amalg & \\ Anch_1 & \Diamond & \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_1 \end{matrix} \right)$$

$\gamma$. **proemial** (green ($\Diamond$) + red ($\amalg$) + black ($\circ$))

$$\begin{pmatrix} Anch_2 \\ \amalg \\ Anch_1 \end{pmatrix} \blacksquare \left( \begin{matrix} \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_2 \\ \amalg \\ \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_1 \end{matrix} \right) = \left( \begin{matrix} Anch_2 & \circ & \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_2 \\ \amalg & \Diamond & \amalg \\ Anch_1 & \circ & \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_1 \end{matrix} \right)$$

$\blacksquare = (\amalg, \Diamond)$

# Tabelle der Basis-Relationalitäten

## Table of basic relational patterns

| i | É | ——ô | þ | ú | ■ | y |
|---|---|---|---|---|---|---|
| | -ô | **morph** | par | chiasm | proem | |
| | þ | par | **med** | dial | dial | |
| | ú | chiasm | dial | **cross** | dial | |
| k | ■ | proem | dial | dial | **cross - med** | { |

# Parallel

- Parallelverknüpfung

$$\alpha.\ \textbf{parallel},\ \text{contextural}\left(\text{red}\left(\amalg\right) + \text{black}\left(\circ\right)\right)$$

$$\begin{pmatrix} \text{Anch}_2 \\ \amalg \\ \text{Anch}_1 \end{pmatrix} \circ \begin{pmatrix} \begin{pmatrix} \text{Rat} \circ \text{Rand} \\ \text{Rel} \end{pmatrix}_2 \\ \amalg \\ \begin{pmatrix} \text{Rat} \circ \text{Rand} \\ \text{Rel} \end{pmatrix}_1 \end{pmatrix} = \begin{pmatrix} \text{Anch}_2 & \circ & \begin{pmatrix} \text{Rat} \circ \text{Rand} \\ \text{Rel} \end{pmatrix}_2 \\ & \amalg & \\ \text{Anch}_1 & \circ & \begin{pmatrix} \text{Rat} \circ \text{Rand} \\ \text{Rel} \end{pmatrix}_1 \end{pmatrix}$$

# Chiasmus

- Überkreuzstellung

$$\beta.\ \textbf{chiasm}\left(\text{green}\left(\Diamond\right)+\text{red}\left(\amalg\right)\right)$$

$$\begin{pmatrix}\text{Anch}_2\\ \amalg\\ \text{Anch}_1\end{pmatrix}\Diamond\begin{pmatrix}\begin{pmatrix}\text{Rat}\circ\text{Rand}\\ \text{Rel}\end{pmatrix}_2\\ \amalg\\ \begin{pmatrix}\text{Rat}\circ\text{Rand}\\ \text{Rel}\end{pmatrix}_1\end{pmatrix}=\begin{pmatrix}\text{Anch}_2 & \Diamond & \begin{pmatrix}\text{Rat}\circ\text{Rand}\\ \text{Rel}\end{pmatrix}_2\\ & \amalg & \\ \text{Anch}_1 & \Diamond & \begin{pmatrix}\text{Rat}\circ\text{Rand}\\ \text{Rel}\end{pmatrix}_1\end{pmatrix}$$

# Proemialrelation

$$\gamma.\ \mathbf{proemial}\left(\text{green}\left(\lozenge\right)+\text{red}\left(\text{II}\right)+\text{black}\left(\circ\right)\right)$$

$$\begin{pmatrix}\text{Anch}_2\\ \text{II}\\ \text{Anch}_1\end{pmatrix} \blacksquare \begin{pmatrix}\begin{pmatrix}\text{Rat}\circ\text{Rand}\\ \text{Rel}\end{pmatrix}_2\\ \text{II}\\ \begin{pmatrix}\text{Rat}\circ\text{Rand}\\ \text{Rel}\end{pmatrix}_1\end{pmatrix} = \begin{pmatrix}\text{Anch}_2 & \circ & \begin{pmatrix}\text{Rat}\circ\text{Rand}\\ \text{Rel}\end{pmatrix}_2\\ \text{II} & \lozenge & \text{II}\\ \text{Anch}_1 & \circ & \begin{pmatrix}\text{Rat}\circ\text{Rand}\\ \text{Rel}\end{pmatrix}_1\end{pmatrix}$$

# Anker als Umgebung

- Die Verankerung, d.h. Begründung des relationalen Systems wird als Umgebung notiert.

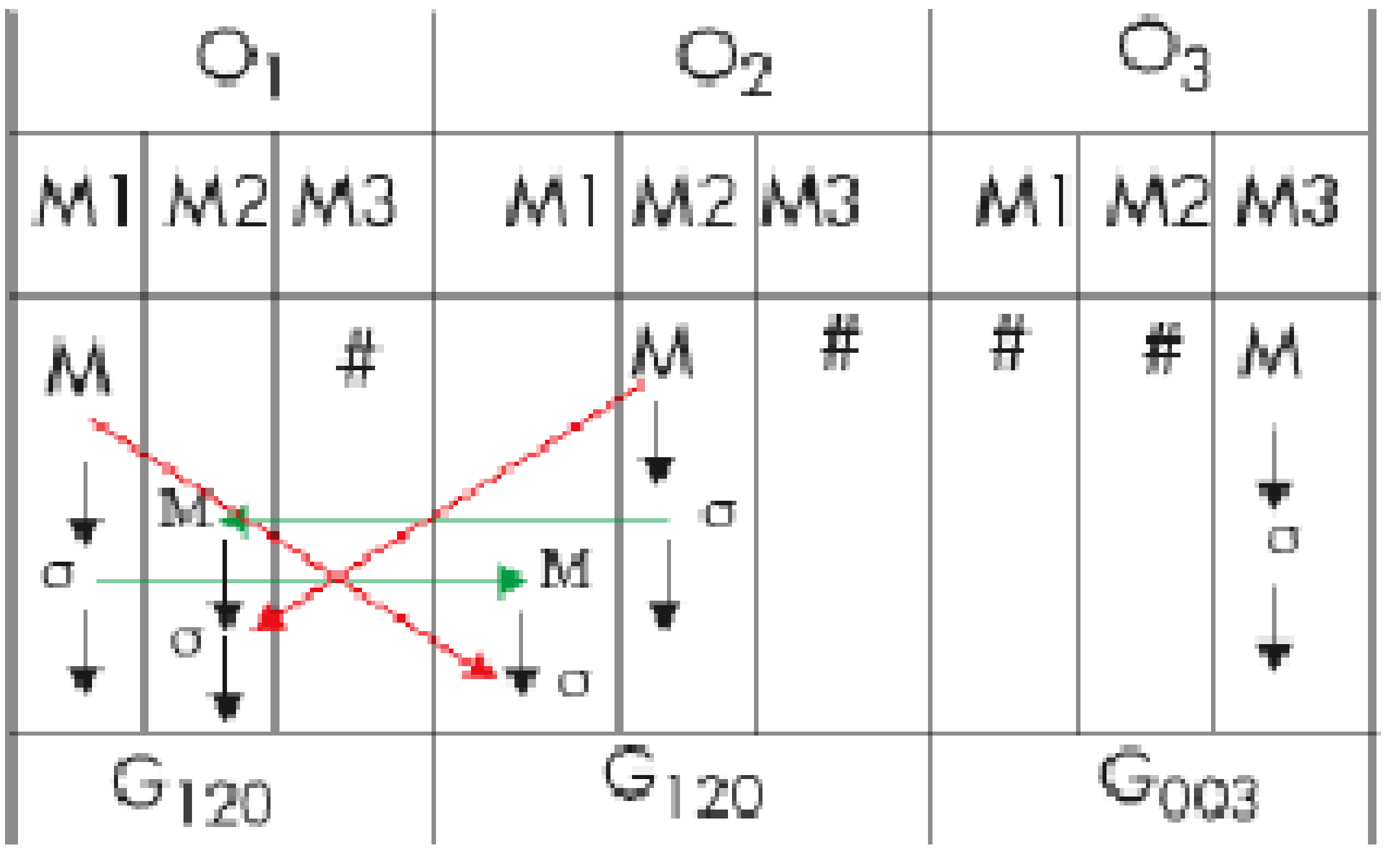
daher folgt mit der Zusammenfassung $\blacksquare = \left( \amalg, \Diamond \right)$ :

$$\left( \begin{matrix} \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_2 & \Big| & Anch_2 \\ \amalg & \Diamond & \amalg \\ \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_1 & \Big| & Anch_1 \end{matrix} \right) = \left( \begin{matrix} \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_2 \\ \amalg \\ \begin{pmatrix} Rat \circ Rand \\ Rel \end{pmatrix}_1 \end{matrix} \right) \Bigg| \left( Anch_2 \blacksquare \; Anch_1 \right)$$

# Lineare Formulierung

# Metamorphose-Matrix

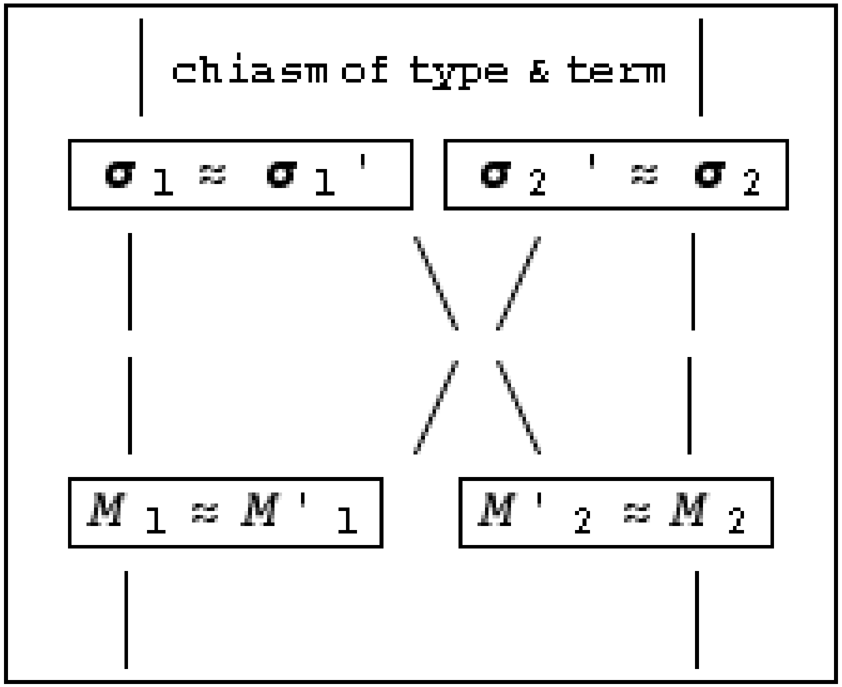
- Matrix = (O, M)
- Metamorphose zwischen O1 und O2



# Metamorphose-Diagramm

- Vermittlung und Überkreuzstellung

**Diagram**



# Metamorphose-Formel

**Formula**

**Metamorphic chiasm of type and term**

$$\left[\left(M,\ \sigma\right),\ \approx,\ \diamond,\ \circ,\ \amalg\right]$$

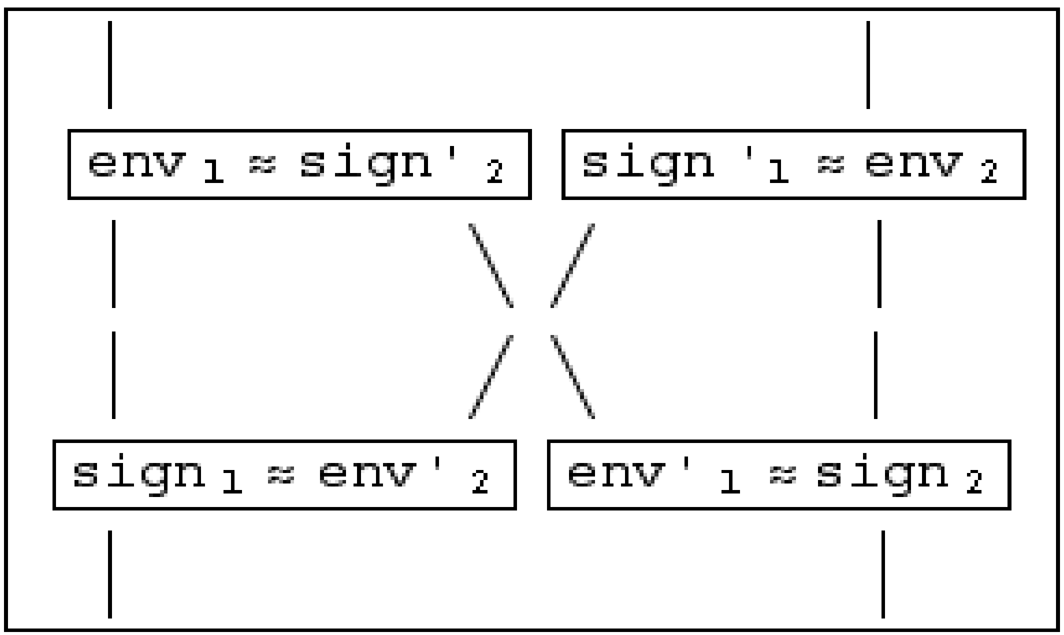
$$\begin{pmatrix} \left(\left(M_1 \approx M'_1\right) \right. & \circ & \left.\left(\sigma_1 \approx \sigma'_1\right)\right) \\ \diamond & \amalg & \diamond \\ \left(\left(M_2 \approx M'_2\right) \right. & \circ & \left.\left(\sigma_2 \approx \sigma'_2\right)\right) \end{pmatrix}$$

$$\begin{bmatrix} \left(M_1 \approx M'_1\right) \\ \amalg \quad \diamond \\ \left(M_2 \approx M'_2\right) \end{bmatrix} \circ \begin{bmatrix} \left(\sigma_1 \approx \sigma'_1\right) \\ \amalg \quad \diamond \\ \left(\sigma_2 \approx \sigma'_2\right) \end{bmatrix} =$$

$$\begin{bmatrix} \left(M_1 \circ \sigma_1\right) \\ \amalg \\ \left(M_2 \circ \sigma_2\right) \end{bmatrix} \approx \begin{bmatrix} \left(M'_1 \circ \sigma'_1\right) \\ \diamond \\ \left(\sigma'_2 \circ M'_2\right) \end{bmatrix}$$

# Metamorphose Interpretation

- Zeichen und Umgebung



# Zeichen-Umgebung-Vertauschbarkeit

**Metamorphic Interchangeability in the**

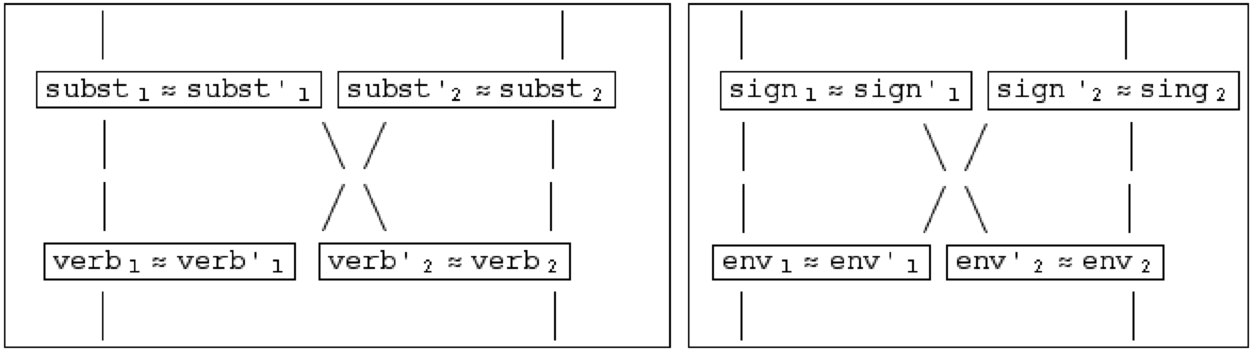
**as - mode** $[\approx, \diamond, \circ, \amalg]$

$$\begin{pmatrix} ((sign_1 \approx env'_2) & \circ & (env_1 \approx sign'_2)) \\ \diamond & \amalg & \diamond \\ ((sign_2 \approx env'_1) & \circ & (env_2 \approx sign'_1)) \end{pmatrix} =$$

$$\begin{bmatrix} (sign_1 \approx env'_2) & \\ \amalg & \diamond \\ (sign_2 \approx g'_2) & \end{bmatrix} \circ \begin{bmatrix} (env_1 \approx g'_1) & \\ \amalg & \diamond \\ (env_2 \approx f'_2) & \end{bmatrix} =$$

$$\begin{bmatrix} (sign_1 \circ env_1) \\ \amalg \\ (sign_2 \circ env_2) \end{bmatrix} \approx \begin{bmatrix} (sign'_2 \circ env'_1) \\ \diamond \\ (g'_2 \circ f'_2) \end{bmatrix}$$

# Substantiv-Verb



# Metamorphische Vertauschbarkeit

**Metamorphic Interchangeability in the as-mode** $[\approx, \diamond, \circ, \amalg]$

$$\begin{pmatrix} \left(\left(f_1 \approx f'_1\right) & \circ & \left(g_1 \approx g'_1\right)\right) \\ \diamond & \amalg & \diamond \\ \left(\left(f_2 \approx f'_2\right) & \circ & \left(g_2 \approx g'_2\right)\right) \end{pmatrix} =$$

$$\begin{bmatrix} \begin{pmatrix} f_1 & \approx & f'_1 \end{pmatrix} \\ \amalg & & \diamond \\ \begin{pmatrix} f_2 & \approx & g'_2 \end{pmatrix} \end{bmatrix} \circ \begin{bmatrix} \begin{pmatrix} g_1 & \approx & g'_1 \end{pmatrix} \\ \amalg & & \diamond \\ \begin{pmatrix} g_2 & \approx & f'_2 \end{pmatrix} \end{bmatrix} =$$

$$\begin{bmatrix} \begin{pmatrix} f_1 & \circ & g_1 \end{pmatrix} \\ \amalg \\ \begin{pmatrix} f_2 & \circ & g_2 \end{pmatrix} \end{bmatrix} \approx \begin{bmatrix} \begin{pmatrix} f'_1 & \circ & g'_1 \end{pmatrix} \\ \diamond \\ \begin{pmatrix} g'_2 & \circ & f'_2 \end{pmatrix} \end{bmatrix}$$

**Operators**

$$\left[\approx,\ \diamond,\ \circ,\ \amalg\right] = \left[\text{as, transvers, composition, mediation}\right]$$

**Wording**

1. $f_1$ as $f_1$, $f_1 \equiv f_1$, is connected with $g_1$ as $g_1$, $g_1 \equiv g_1$, by composition : $\left(f_1 \circ g_1\right)$

2. $f_2$ as $f_2$, $f_2 \equiv f_2$, is connected with $g_2$ as $g_2$, $g_1 \equiv g_1$, by composition : $\left(f_2 \circ g_2\right)$;

3. $f_1$ as $f_1$ is connected with $f_2$ as $f_2$ by mediation : $\begin{pmatrix} f_1 \\ \amalg \\ f_2 \end{pmatrix}$

4. $g_1$ as $g_1$ is connected with $g_2$ as $g_2$ by mediation : $\begin{pmatrix} g_1 \\ \amalg \\ g_2 \end{pmatrix}$;

5. $f_1$ as $f'_1$, $\left(f_1 \approx f'_1\right)$,

is connected with $g_2$ as $g'_2$, $\left(g_2 \approx g'_2\right)$, by transversality : $\begin{pmatrix} f'_1 \\ \diamond \\ g'_2 \end{pmatrix}$

6. $g_1$ as $g'_1$, $\left(g_1 \approx g'_1\right)$,

is connected with $f_2$ as $f'_2$, $\left(f_2 \approx f'_2\right)$, by transversality : $\begin{pmatrix} g'_1 \\ \diamond \\ f'_2 \end{pmatrix}$.

Hence, the term "f" as $\left(f,\ f'\right)$ is *at once* in a *compositional* relation with "g"
and in a *transversal* relation with "g'",
as well as in a *mediational* relation with the composition "∘".

**Metamorphic interchangeability of interpretations**

1. $verb_1$ as $verb_1$, is connected with $substantiv_1$ as $substantiv_1$, by composition : $(verb_1 \circ substantiv_1)$

2. $verb_2$ as $verb_2$, is connected with $substantiv_2$ as $substantiv_2$, by composition : $(verb_2 \circ substantiv_2)$;

3. $verb_1$ as $verb_1$ is connected with $verb_2$ as $verb_2$ by mediation : $\begin{pmatrix} verb_1 \\ \amalg \\ verb_2 \end{pmatrix}$

4. $substantiv_1$ as $substantiv_1$ is connected with $substantiv_2$ as $substantiv_2$ by mediation : $\begin{pmatrix} substantiv_1 \\ \amalg \\ substantiv_2 \end{pmatrix}$;

5. $verb_1$ as $verb'_1$, $(verb_1 \approx verb'_1)$,

is connected with $substantiv_2$ as $substantiv'_2$, $(substantiv_2 \approx substantiv'_2)$, by transversality : $\begin{pmatrix} verb'_1 \\ \diamond \\ substantiv'_2 \end{pmatrix}$

6. $substantiv_1$ as $substantiv'_1$, $(substantiv_1 \approx substantiv'_1)$,

is connected with $verb_2$ as $verb'_2$, $(verb_2 \approx verb'_2)$, by transversality : $\begin{pmatrix} substantiv'_1 \\ \diamond \\ verb'_2 \end{pmatrix}$.

# Verb-Substantiv-Metamorphismus

**Metamorphic interchangeability in the as – mode** $[\approx, \diamond, \circ, \amalg]$

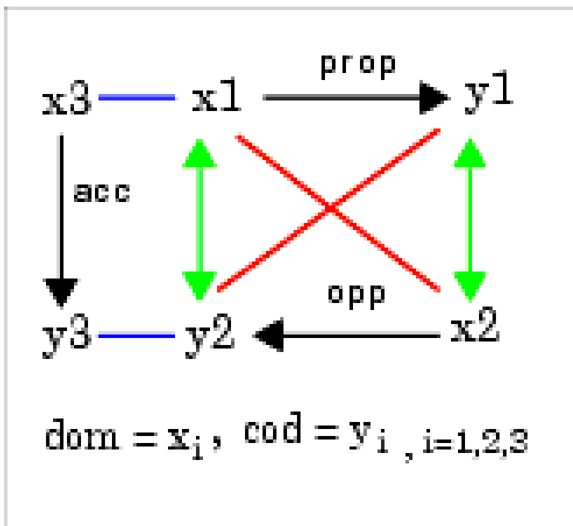
$$\begin{pmatrix} ((verb_1 \approx verb'_1) & \circ & (substantive_1 \approx substantiv'_1)) \\ \diamond & \amalg & \diamond \\ ((verb_2 \approx verb'_2) & \circ & (substantiv_2 \approx substantiv'_2)) \end{pmatrix} =$$

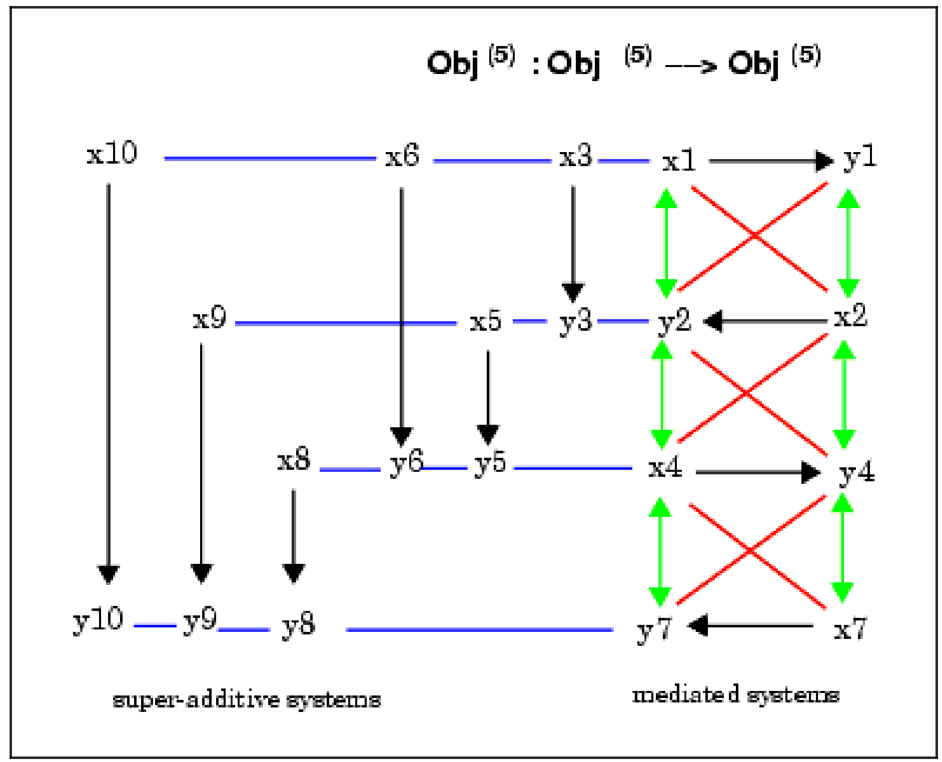
$$\begin{bmatrix} (verb_1 \approx & verb'_1) \\ \amalg & \diamond \\ (verb_2 \approx & substantiv'_2) \end{bmatrix} \circ \begin{bmatrix} (substantiv_1 \approx & substantiv'_1) \\ \amalg & \diamond \\ (substantiv_2 \approx & verb'_2) \end{bmatrix} =$$

$$\begin{bmatrix} (verb_1 \circ substantiv_1) \\ \amalg \\ (verb_2 \circ substantiv_2) \end{bmatrix} \approx \begin{bmatrix} (verb'_1 \circ substantiv'_1) \\ \diamond \\ (substantiv'_2 \circ verb'_2) \end{bmatrix}$$

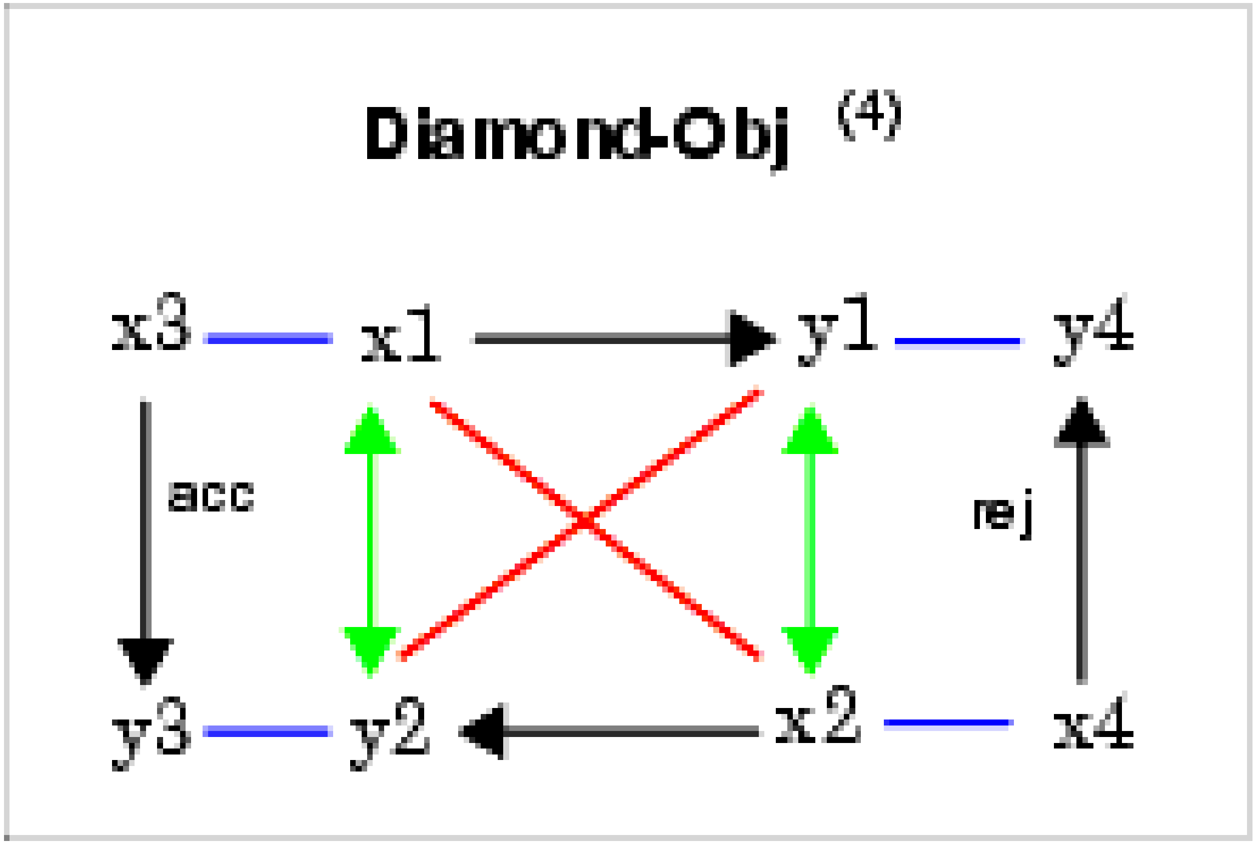
# Diamond-Diagramm

- Chiasmus als Vorstufe zum Diamond

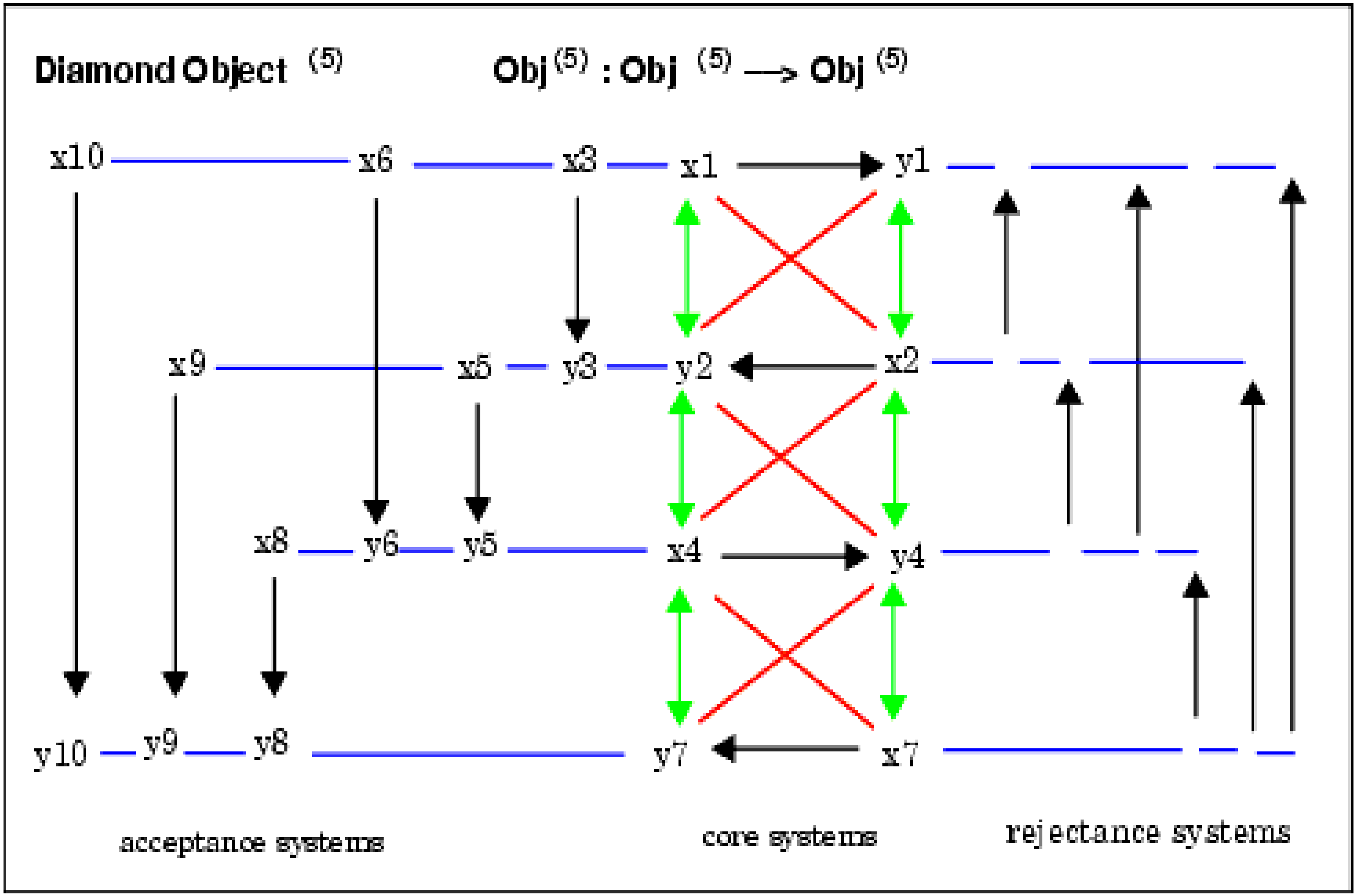


# Diamond-Diagramm

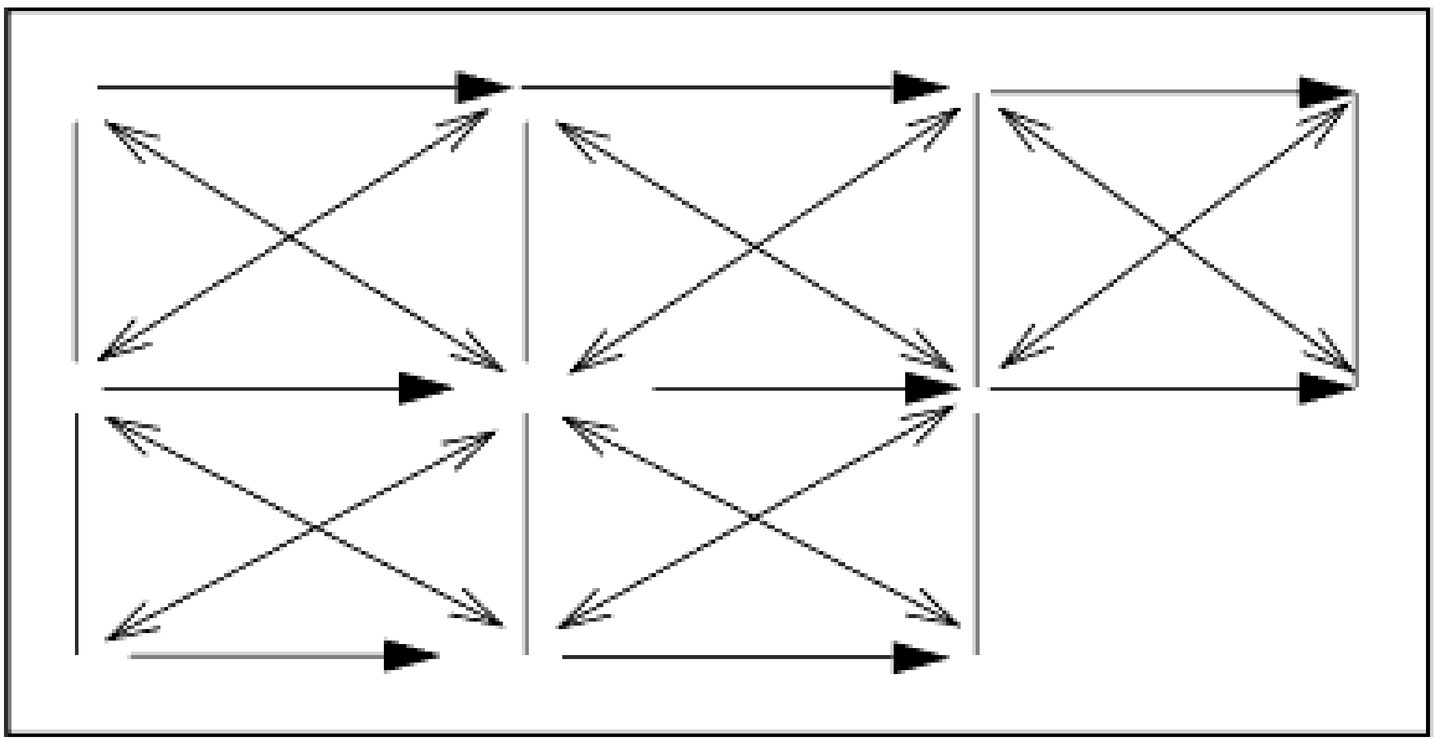


# Akkretive Diamond-Verknüpfung



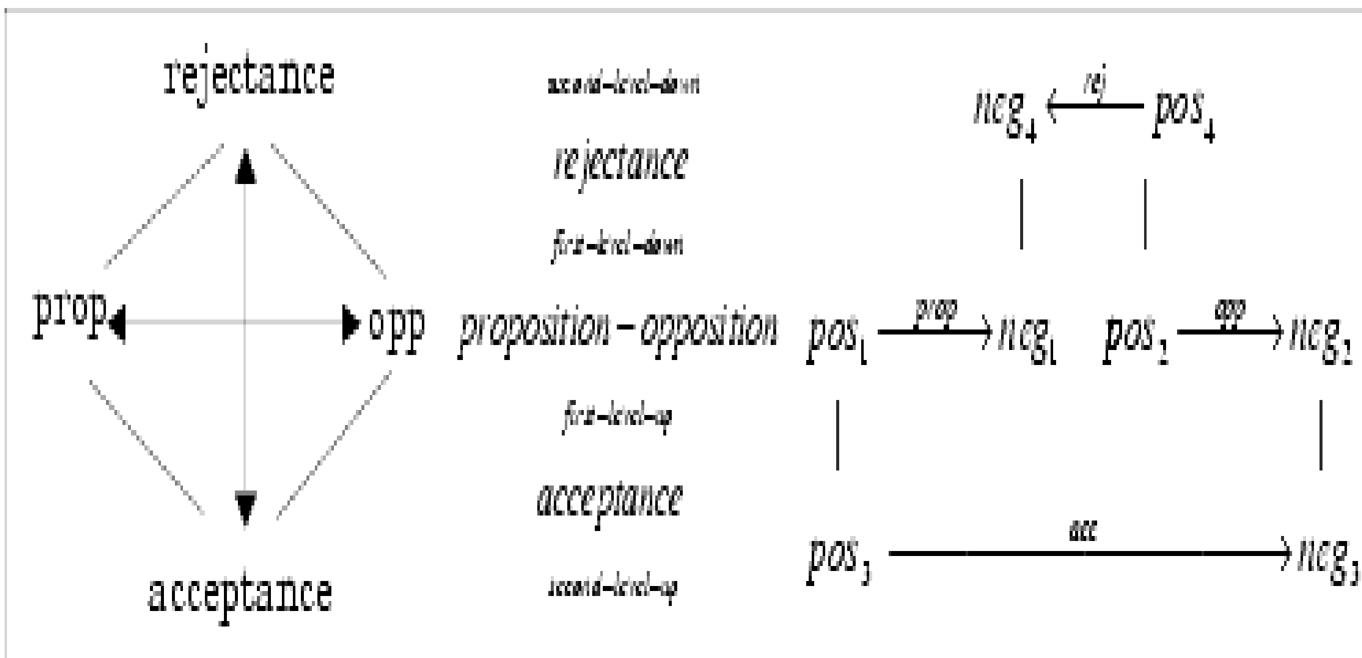
# Diamond-Netze

- Kreuz und Quer



# Diamond Strategie & Kategorie

- Diamond und ogische Interpretation



# Diamond-Grund-Formel

- Diamond basierend auf der Rückläufigkeit der vorläufigen Komposition
- Morphismen als Ereignisse mit Anfängen und Enden

$$\left(B^{1}, \omega_{4}\right) \leftarrow \left(A^{2}, \alpha_{4}\right)$$

$$\delta$$

$$\left(A^{1}, \alpha_{1}\right) \xrightarrow{morph} \left(B^{1}, \omega_{1}\right)\ o\ \left(A^{2}, \alpha_{2}\right) \xrightarrow{morph} \left(B^{2}, \omega_{2}\right)$$

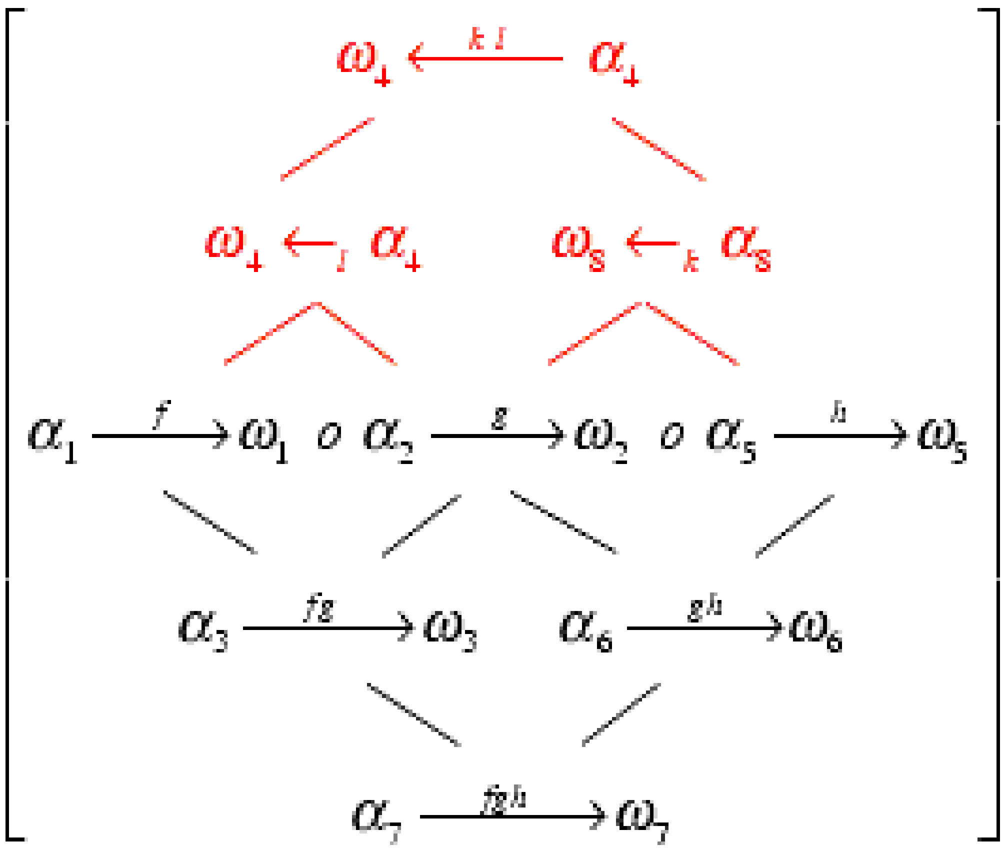
$$\varphi$$

$$\left(A^{1}, \alpha_{3}\right) \xrightarrow{morph} \left(B^{2}, \omega_{3}\right)$$

- Definition der Grundformel
- o: Komposition
- phi: Koinzidenz
- delta: Differenz Morphismen und Saltitionen

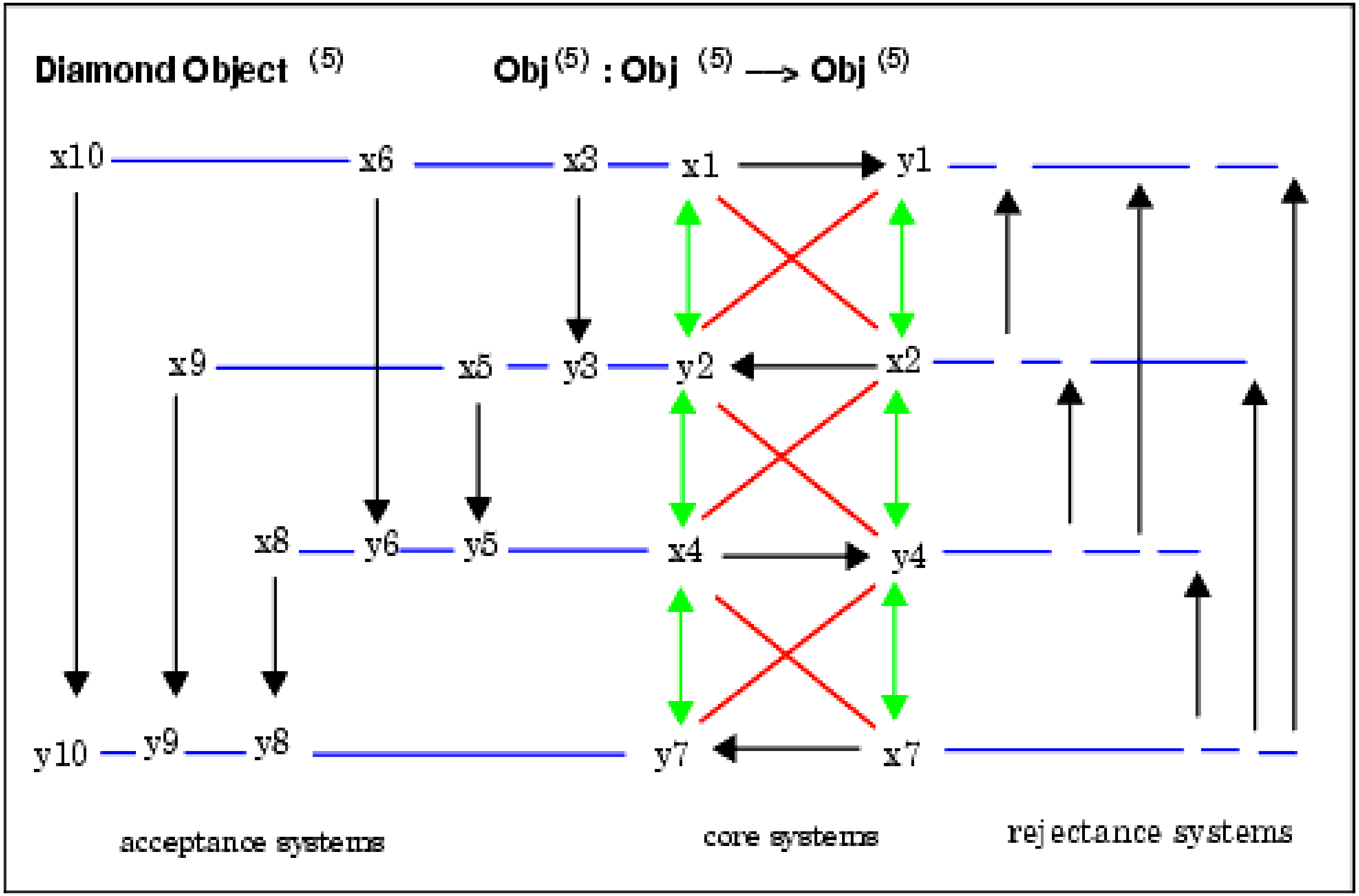
$$\left[\begin{array}{l} o = \begin{cases} \lambda(\omega_1) & \lambda(\alpha_2) \\ \lambda(A^2) & \lambda(B^1) \end{cases} \\ \varphi(A^1, \alpha_1) = \varphi(A^1, \alpha_3) \\ \varphi(B^2, \omega_2) = \varphi(B^2, \omega_3) \\ \delta((B^1, \omega_1) \; o \; (A^2, \alpha_2)) = \\ (\delta(B^1), \omega_4) \leftarrow (\delta(A^2), \alpha_4) \end{array}\right]$$

# Composition versus Saltisation

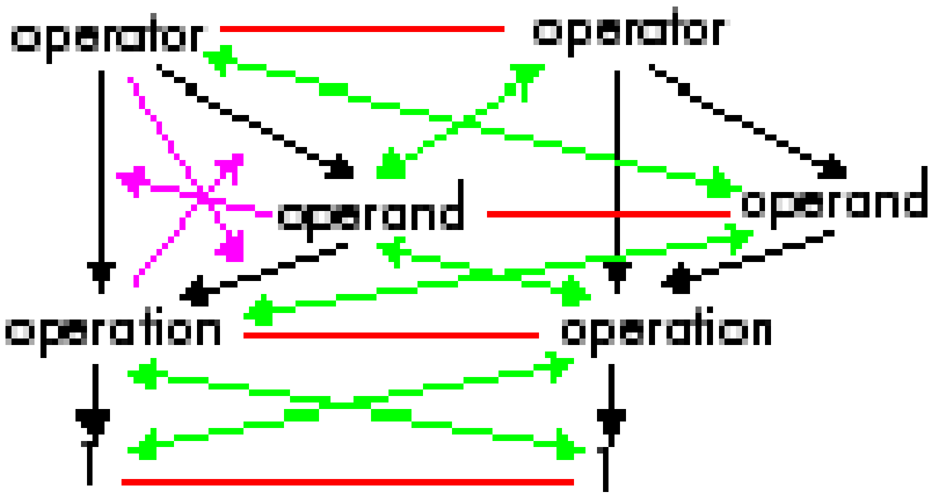
- 

# Proömialität, das Geviert, abwärts

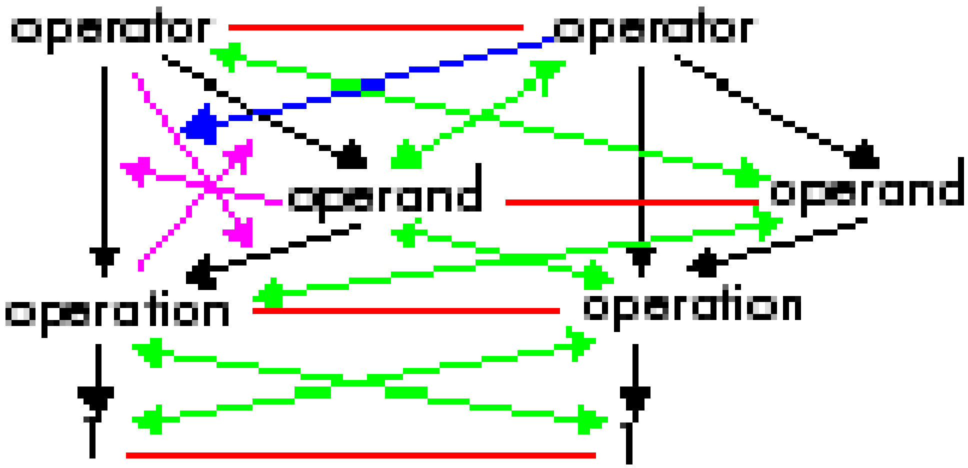
# Diamond: das Geviert Auf und Abwärts



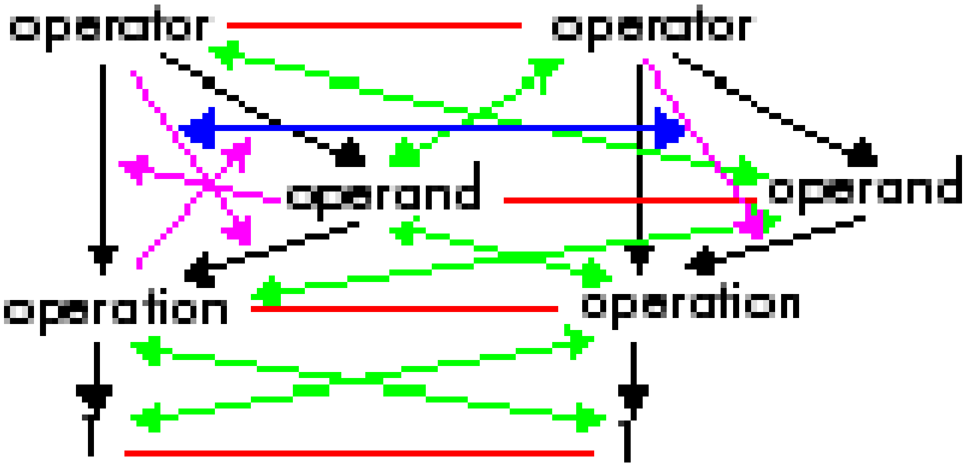
# Subjektivität



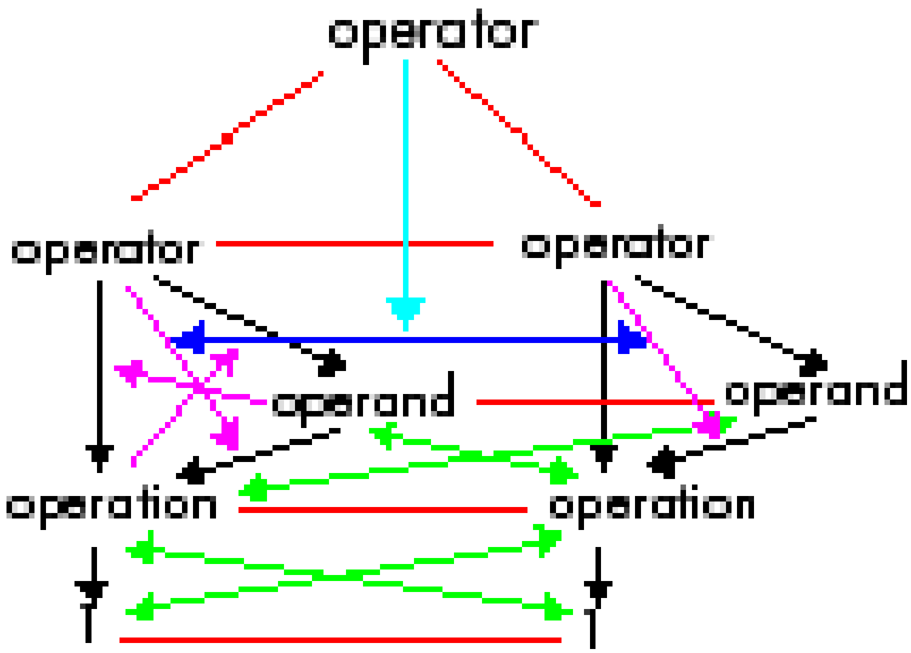
# Intervention



# Interlocution

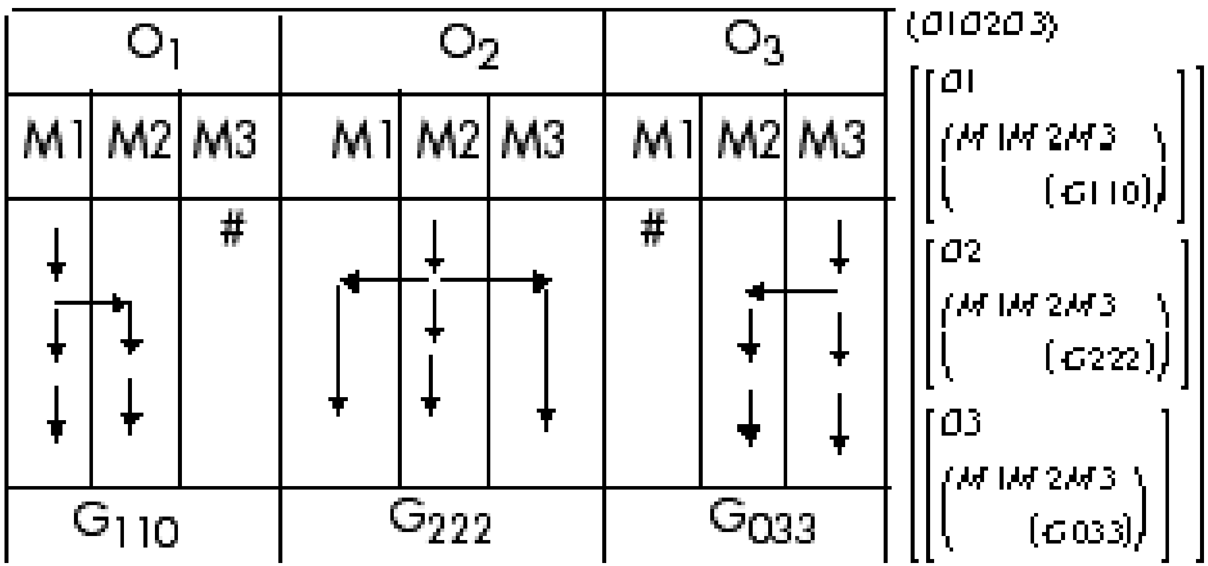


# Interlocution-2



# Diagramm, Klammer, Matrix

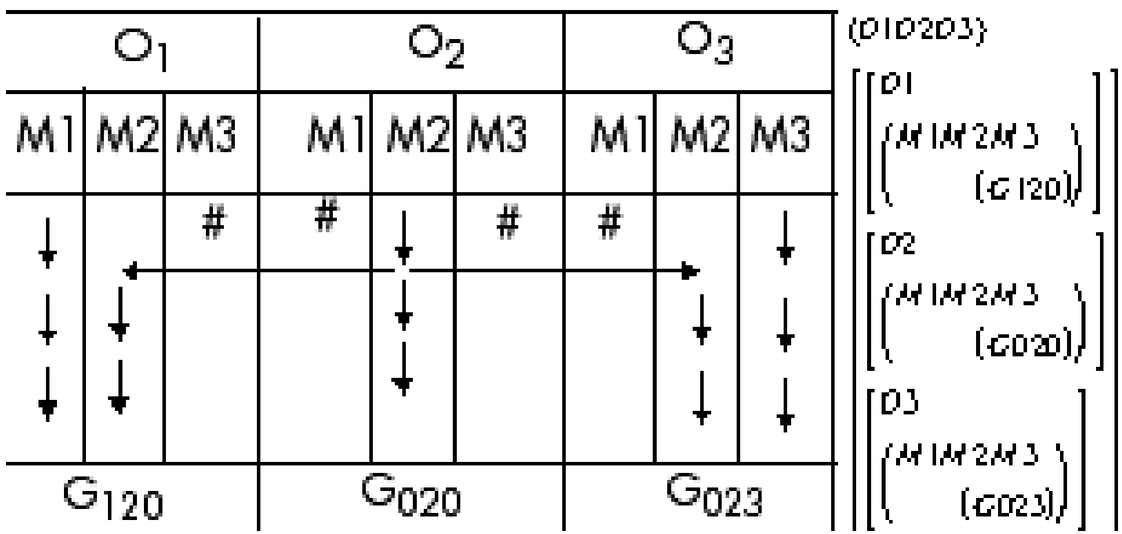
- Reflexion in sich




| PM | O1 | O2 | O3 |
|---|---|---|---|
| M1 | $S_1$ | $S_2$ | Ø |
| M2 | $S_1$ | $S_2$ | $S_3$ |
| M3 | Ø | $S_2$ | $S_3$ |

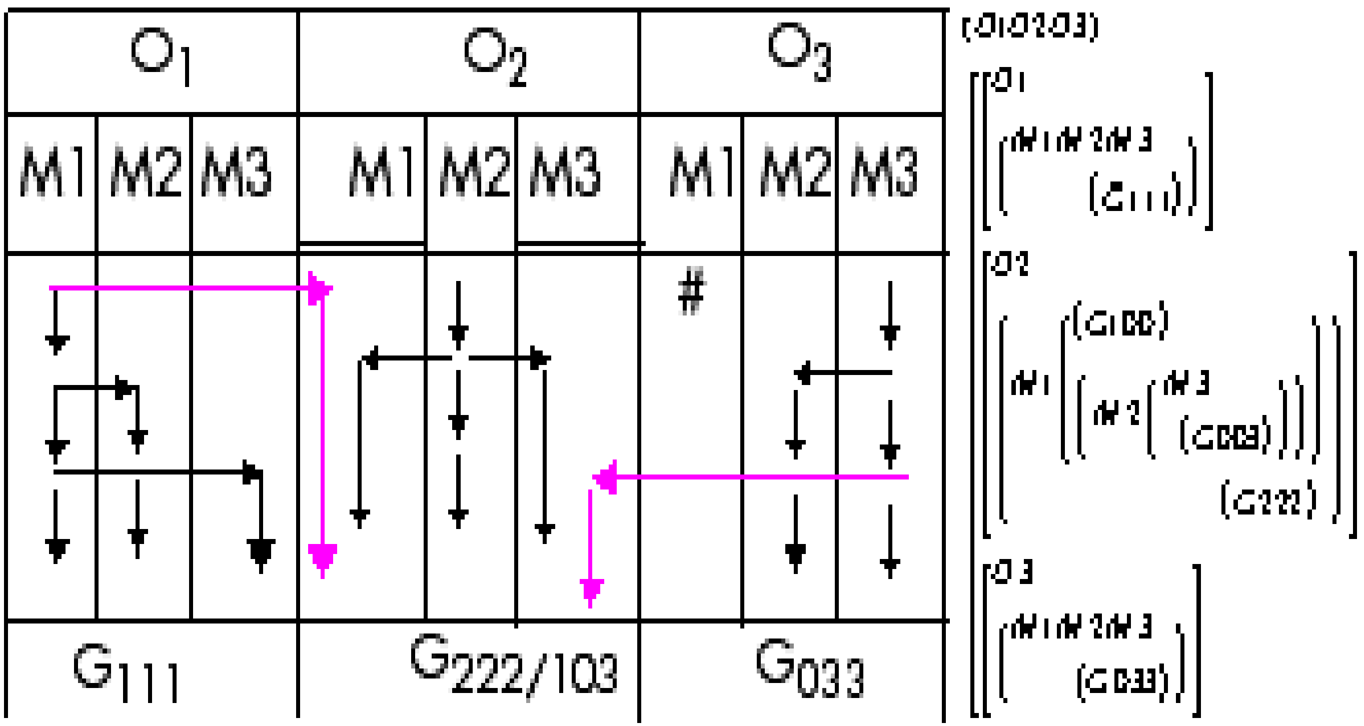
# Diagramm, Klammer, Matrix

- Reflexion in anderes




| PM | O1 | O2 | O3 |
|---|---|---|---|
| M1 | $S_1$ | ∅ | ∅ |
| M2 | $S_1$ | $S_1$ | $S_1$ |
| M3 | ∅ | ∅ | $S_3$ |

# Gemischte Pattern




| PM | O1 | O2 | O3 |
|---|---|---|---|
| M1 | $S_1$ | $S_{2.1}$ | Ø |
| M2 | $S_1$ | $S_{20}$ | $S_3$ |
| M3 | $S_1$ | $S_{23}$ | $S_3$ |

# ThinkArt Lab Diagrammatik

thinkart lab

new visions | arts | science