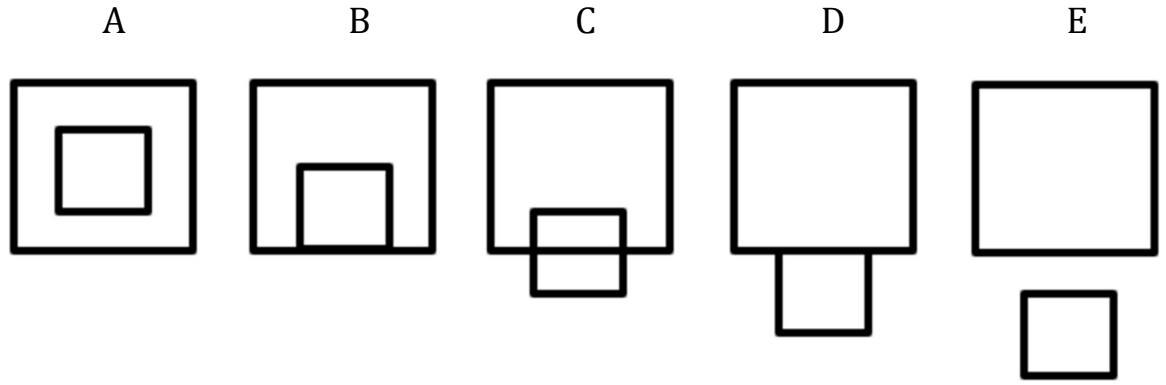
Prof. Dr. Alfred Toth

Ontische Bewegungstransformationen

1. In der vorliegenden Arbeit sollen die ontischen Bewegungstransformationen mit Hilfe der Kategorientheorie auf der Basis der differentiellen semiotischen Matrix (vgl. Bense 1975, S. 105) sowie der 5 ontotopologischen Strukturtypen (vgl. Toth 2015) formal definiert werden.

2. Gegeben seien zwei topologische Räume A und B mit $A \sqsubset B$ und $S = (A, B)$ sowie ein ontische Einbettungsrelation $L = (ex, ad, in)$. B soll nun so aus A in Richtung U(S) verschoben werden, daß sich die Lagen für B nur hinsichtlich der Teilrelationen von L unterscheiden. (D.h., alle übrigen eventuellen Verschiebung sind ausgeschlossen, da sie nicht-invariant sind.) Dann gibt es genau 5 mögliche Strukturtypen:



mit

$A \sqsubset B$, $A \sqsubset R(S, U)$, $A \sqsubset R(S \sqcup U)$, $A \sqsubset R(U, S)$, $A \sqsubset U(B)$.

Im folgenden werden die 5 Strukturtypen mit Hilfe von differentiellen Zeichenklassen (vgl. Steffen 1981) definiert und durch je ein ontisches Modell illustriert.

ZKl diff A

((3.2, 3.1), (2.3, 2.1), (1.2, 1.3))

Kreuzstr. 40, 8008 Zürich

ZKl diff B

((3.2, 3.2), (2.3, 2.2), (1.2, 1.3))

Pfingstweidstr. 94, 8005 Zürich

ZKl diff C

((3.2, 3.1), (2.3, 2.2), (1.2, 1.3))

Rue Mouffetard, Paris

ZKl diff D

((3.2, 3.2), (2.3, 2.2), (1.2, 1.3))

Weidmannstr. 12, 8046 Zürich

ZKl diff E

((3.2, 3.1), (2.3, 2.3), (1.2, 1.3))

Rue de Bretagne, Paris

2. Wird A auf die angegebene Weise aus B herausbewegt, so kann man in einem weiteren Schritt die 5 möglichen Bewegungstransformationen aufeinander abbilden. Man erhält dadurch genau die im folgenden definierten 10 Möglichkeiten.

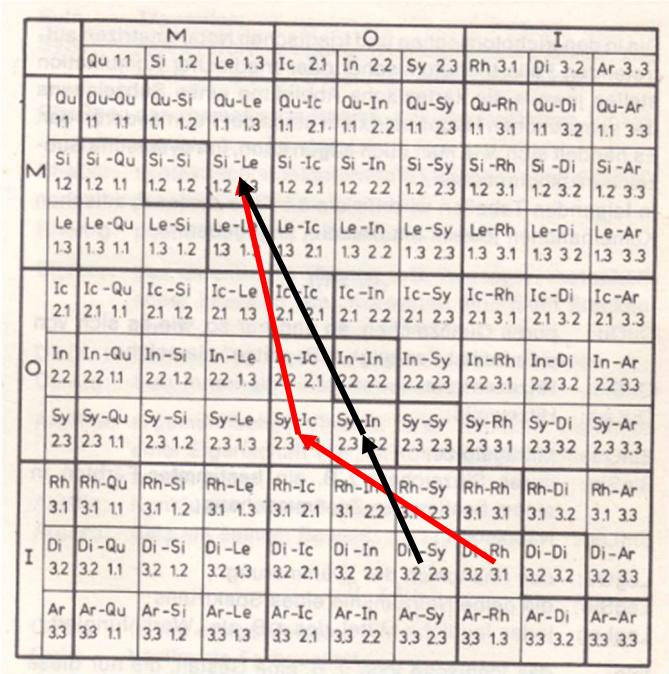
2.1. A → B

((3.2, 3.1), (2.3, 2.1), (1.2, 1.3))

↓

((3.2, 3.2), (2.3, 2.2), (1.2, 1.3)) =

(((id3, id2), (id3, α)), ((id2, id3), (id2, α)), ((id1, id2), (id1, id3)))



		M			O			I		
		Qu 1.1	Si 1.2	Le 1.3	Ic 2.1	In 2.2	Sy 2.3	Rh 3.1	Di 3.2	Ar 3.3
M	Qu 1.1	Qu-Qu 1.1 1.1	Qu-Si 1.1 1.2	Qu-Le 1.1 1.3	Qu-Ic 1.1 2.1	Qu-In 1.1 2.2	Qu-Sy 1.1 2.3	Qu-Rh 1.1 3.1	Qu-Di 1.1 3.2	Qu-Ar 1.1 3.3
	Si 1.2	Si-Qu 1.2 1.1	Si-Si 1.2 1.2	Si-Le 1.2 1.3	Si-Ic 1.2 2.1	Si-In 1.2 2.2	Si-Sy 1.2 2.3	Si-Rh 1.2 3.1	Si-Di 1.2 3.2	Si-Ar 1.2 3.3
	Le 1.3	Le-Qu 1.3 1.1	Le-Si 1.3 1.2	Le-Le 1.3 1.3	Le-Ic 1.3 2.1	Le-In 1.3 2.2	Le-Sy 1.3 2.3	Le-Rh 1.3 3.1	Le-Di 1.3 3.2	Le-Ar 1.3 3.3
O	Ic 2.1	Ic-Qu 2.1 1.1	Ic-Si 2.1 1.2	Ic-Le 2.1 1.3	Ic-Ic 2.1 2.1	Ic-In 2.1 2.2	Ic-Sy 2.1 2.3	Ic-Rh 2.1 3.1	Ic-Di 2.1 3.2	Ic-Ar 2.1 3.3
	In 2.2	In-Qu 2.2 1.1	In-Si 2.2 1.2	In-Le 2.2 1.3	In-Ic 2.2 2.1	In-In 2.2 2.2	In-Sy 2.2 2.3	In-Rh 2.2 3.1	In-Di 2.2 3.2	In-Ar 2.2 3.3
	Sy 2.3	Sy-Qu 2.3 1.1	Sy-Si 2.3 1.2	Sy-Le 2.3 1.3	Sy-Ic 2.3 2.1	Sy-In 2.3 2.2	Sy-Sy 2.3 2.3	Sy-Rh 2.3 3.1	Sy-Di 2.3 3.2	Sy-Ar 2.3 3.3
I	Rh 3.1	Rh-Qu 3.1 1.1	Rh-Si 3.1 1.2	Rh-Le 3.1 1.3	Rh-Ic 3.1 2.1	Rh-In 3.1 2.2	Rh-Sy 3.1 2.3	Rh-Rh 3.1 3.1	Rh-Di 3.1 3.2	Rh-Ar 3.1 3.3
	Di 3.2	Di-Qu 3.2 1.1	Di-Si 3.2 1.2	Di-Le 3.2 1.3	Di-Ic 3.2 2.1	Di-In 3.2 2.2	Di-Sy 3.2 2.3	Di-Rh 3.2 3.1	Di-Di 3.2 3.2	Di-Ar 3.2 3.3
	Ar 3.3	Ar-Qu 3.3 1.1	Ar-Si 3.3 1.2	Ar-Le 3.3 1.3	Ar-Ic 3.3 2.1	Ar-In 3.3 2.2	Ar-Sy 3.3 2.3	Ar-Rh 3.3 1.3	Ar-Di 3.3 3.2	Ar-Ar 3.3 3.3

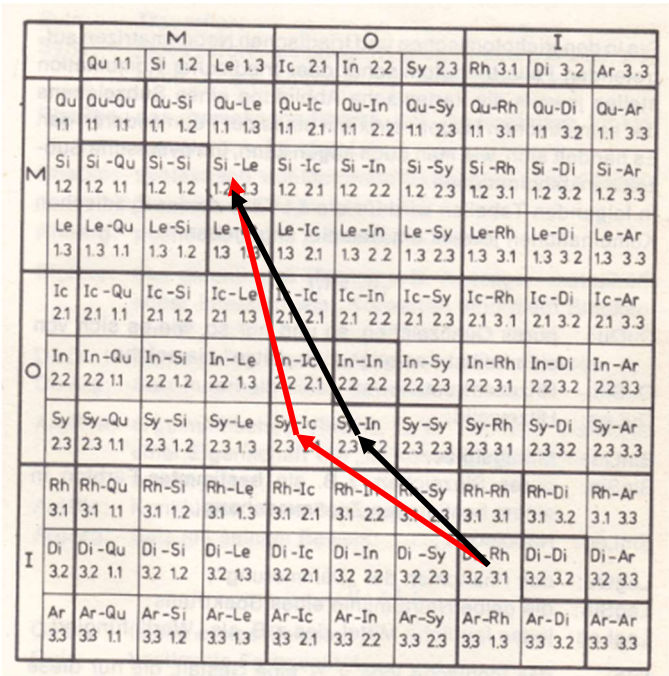
2.2. A → C

((3.2, 3.1), (2.3, 2.1), (1.2, 1.3))

↓

((3.2, 3.1), (2.3, 2.2), (1.2, 1.3)) =

(((id3, id2), (id3, id1)), ((id2, id3), (id2, α)), ((id1, id2), (id1, id3))



		M			O			I		
		Qu 1.1	Si 1.2	Le 1.3	Ic 2.1	In 2.2	Sy 2.3	Rh 3.1	Di 3.2	Ar 3.3
M	Qu 1.1	Qu-Qu 1.1 1.1	Qu-Si 1.1 1.2	Qu-Le 1.1 1.3	Qu-Ic 1.1 2.1	Qu-In 1.1 2.2	Qu-Sy 1.1 2.3	Qu-Rh 1.1 3.1	Qu-Di 1.1 3.2	Qu-Ar 1.1 3.3
	Si 1.2	Si-Qu 1.2 1.1	Si-Si 1.2 1.2	Si-Le 1.2 1.3	Si-Ic 1.2 2.1	Si-In 1.2 2.2	Si-Sy 1.2 2.3	Si-Rh 1.2 3.1	Si-Di 1.2 3.2	Si-Ar 1.2 3.3
	Le 1.3	Le-Qu 1.3 1.1	Le-Si 1.3 1.2	Le-Le 1.3 1.3	Le-Ic 1.3 2.1	Le-In 1.3 2.2	Le-Sy 1.3 2.3	Le-Rh 1.3 3.1	Le-Di 1.3 3.2	Le-Ar 1.3 3.3
O	Ic 2.1	Ic-Qu 2.1 1.1	Ic-Si 2.1 1.2	Ic-Le 2.1 1.3	Ic-Ic 2.1 2.1	Ic-In 2.1 2.2	Ic-Sy 2.1 2.3	Ic-Rh 2.1 3.1	Ic-Di 2.1 3.2	Ic-Ar 2.1 3.3
	In 2.2	In-Qu 2.2 1.1	In-Si 2.2 1.2	In-Le 2.2 1.3	In-Ic 2.2 2.1	In-In 2.2 2.2	In-Sy 2.2 2.3	In-Rh 2.2 3.1	In-Di 2.2 3.2	In-Ar 2.2 3.3
	Sy 2.3	Sy-Qu 2.3 1.1	Sy-Si 2.3 1.2	Sy-Le 2.3 1.3	Sy-Ic 2.3 2.1	Sy-In 2.3 2.2	Sy-Sy 2.3 2.3	Sy-Rh 2.3 3.1	Sy-Di 2.3 3.2	Sy-Ar 2.3 3.3
I	Rh 3.1	Rh-Qu 3.1 1.1	Rh-Si 3.1 1.2	Rh-Le 3.1 1.3	Rh-Ic 3.1 2.1	Rh-In 3.1 2.2	Rh-Sy 3.1 2.3	Rh-Rh 3.1 3.1	Rh-Di 3.1 3.2	Rh-Ar 3.1 3.3
	Di 3.2	Di-Qu 3.2 1.1	Di-Si 3.2 1.2	Di-Le 3.2 1.3	Di-Ic 3.2 2.1	Di-In 3.2 2.2	Di-Sy 3.2 2.3	Di-Rh 3.2 3.1	Di-Di 3.2 3.2	Di-Ar 3.2 3.3
	Ar 3.3	Ar-Qu 3.3 1.1	Ar-Si 3.3 1.2	Ar-Le 3.3 1.3	Ar-Ic 3.3 2.1	Ar-In 3.3 2.2	Ar-Sy 3.3 2.3	Ar-Rh 3.3 1.3	Ar-Di 3.3 3.2	Ar-Ar 3.3 3.3

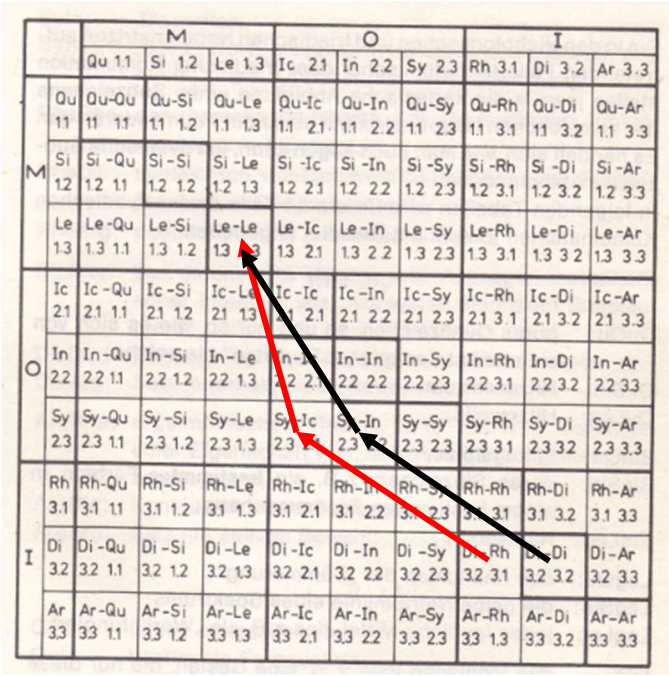
2.3. A → D

((3.2, 3.1), (2.3, 2.1), (1.2, 1.3))

↓

((3.2, 3.2), (2.3, 2.2), (1.2, 1.3)) =

(((id3, id2), (id3, α)), ((id2, id3), (id2, α)), ((id1, di2), (id1, id3)))



		M			O			I		
		Qu 1.1	Si 1.2	Le 1.3	Ic 2.1	In 2.2	Sy 2.3	Rh 3.1	Di 3.2	Ar 3.3
M	Qu 1.1	Qu-Qu 1.1 1.1	Qu-Si 1.1 1.2	Qu-Le 1.1 1.3	Qu-Ic 1.1 2.1	Qu-In 1.1 2.2	Qu-Sy 1.1 2.3	Qu-Rh 1.1 3.1	Qu-Di 1.1 3.2	Qu-Ar 1.1 3.3
	Si 1.2	Si-Qu 1.2 1.1	Si-Si 1.2 1.2	Si-Le 1.2 1.3	Si-Ic 1.2 2.1	Si-In 1.2 2.2	Si-Sy 1.2 2.3	Si-Rh 1.2 3.1	Si-Di 1.2 3.2	Si-Ar 1.2 3.3
	Le 1.3	Le-Qu 1.3 1.1	Le-Si 1.3 1.2	Le-Le 1.3 1.3	Le-Ic 1.3 2.1	Le-In 1.3 2.2	Le-Sy 1.3 2.3	Le-Rh 1.3 3.1	Le-Di 1.3 3.2	Le-Ar 1.3 3.3
O	Ic 2.1	Ic-Qu 2.1 1.1	Ic-Si 2.1 1.2	Ic-Le 2.1 1.3	Ic-Ic 2.1 2.1	Ic-In 2.1 2.2	Ic-Sy 2.1 2.3	Ic-Rh 2.1 3.1	Ic-Di 2.1 3.2	Ic-Ar 2.1 3.3
	In 2.2	In-Qu 2.2 1.1	In-Si 2.2 1.2	In-Le 2.2 1.3	In-Ic 2.2 2.1	In-In 2.2 2.2	In-Sy 2.2 2.3	In-Rh 2.2 3.1	In-Di 2.2 3.2	In-Ar 2.2 3.3
	Sy 2.3	Sy-Qu 2.3 1.1	Sy-Si 2.3 1.2	Sy-Le 2.3 1.3	Sy-Ic 2.3 2.1	Sy-In 2.3 2.2	Sy-Sy 2.3 2.3	Sy-Rh 2.3 3.1	Sy-Di 2.3 3.2	Sy-Ar 2.3 3.3
I	Rh 3.1	Rh-Qu 3.1 1.1	Rh-Si 3.1 1.2	Rh-Le 3.1 1.3	Rh-Ic 3.1 2.1	Rh-In 3.1 2.2	Rh-Sy 3.1 2.3	Rh-Rh 3.1 3.1	Rh-Di 3.1 3.2	Rh-Ar 3.1 3.3
	Di 3.2	Di-Qu 3.2 1.1	Di-Si 3.2 1.2	Di-Le 3.2 1.3	Di-Ic 3.2 2.1	Di-In 3.2 2.2	Di-Sy 3.2 2.3	Di-Rh 3.2 3.1	Di-Di 3.2 3.2	Di-Ar 3.2 3.3
	Ar 3.3	Ar-Qu 3.3 1.1	Ar-Si 3.3 1.2	Ar-Le 3.3 1.3	Ar-Ic 3.3 2.1	Ar-In 3.3 2.2	Ar-Sy 3.3 2.3	Ar-Rh 3.3 1.3	Ar-Di 3.3 3.2	Ar-Ar 3.3 3.3

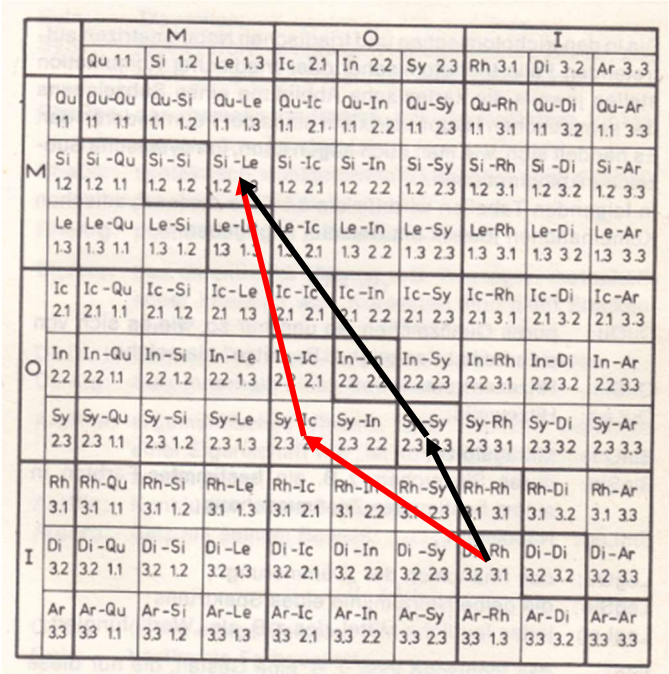
2.4. A → E

((3.2, 3.1), (2.3, 2.1), (1.2, 1.3))

↓

((3.2, 3.1), (2.3, 2.3), (1.2, 1.3)) =

(((id3, id2), (id3, id1)), ((id2, id3), (id2, βα)), ((id1, id2), (id1, id3)))



		M			O			I		
		Qu 1.1	Si 1.2	Le 1.3	Ic 2.1	In 2.2	Sy 2.3	Rh 3.1	Di 3.2	Ar 3.3
M	Qu 1.1	Qu-Qu 1.1 1.1	Qu-Si 1.1 1.2	Qu-Le 1.1 1.3	Qu-Ic 1.1 2.1	Qu-In 1.1 2.2	Qu-Sy 1.1 2.3	Qu-Rh 1.1 3.1	Qu-Di 1.1 3.2	Qu-Ar 1.1 3.3
	Si 1.2	Si-Qu 1.2 1.1	Si-Si 1.2 1.2	Si-Le 1.2 1.3	Si-Ic 1.2 2.1	Si-In 1.2 2.2	Si-Sy 1.2 2.3	Si-Rh 1.2 3.1	Si-Di 1.2 3.2	Si-Ar 1.2 3.3
	Le 1.3	Le-Qu 1.3 1.1	Le-Si 1.3 1.2	Le-Le 1.3 1.3	Le-Ic 1.3 2.1	Le-In 1.3 2.2	Le-Sy 1.3 2.3	Le-Rh 1.3 3.1	Le-Di 1.3 3.2	Le-Ar 1.3 3.3
O	Ic 2.1	Ic-Qu 2.1 1.1	Ic-Si 2.1 1.2	Ic-Le 2.1 1.3	Ic-Ic 2.1 2.1	Ic-In 2.1 2.2	Ic-Sy 2.1 2.3	Ic-Rh 2.1 3.1	Ic-Di 2.1 3.2	Ic-Ar 2.1 3.3
	In 2.2	In-Qu 2.2 1.1	In-Si 2.2 1.2	In-Le 2.2 1.3	In-Ic 2.2 2.1	In-In 2.2 2.2	In-Sy 2.2 2.3	In-Rh 2.2 3.1	In-Di 2.2 3.2	In-Ar 2.2 3.3
	Sy 2.3	Sy-Qu 2.3 1.1	Sy-Si 2.3 1.2	Sy-Le 2.3 1.3	Sy-Ic 2.3 2.1	Sy-In 2.3 2.2	Sy-Sy 2.3 2.3	Sy-Rh 2.3 3.1	Sy-Di 2.3 3.2	Sy-Ar 2.3 3.3
I	Rh 3.1	Rh-Qu 3.1 1.1	Rh-Si 3.1 1.2	Rh-Le 3.1 1.3	Rh-Ic 3.1 2.1	Rh-In 3.1 2.2	Rh-Sy 3.1 2.3	Rh-Rh 3.1 3.1	Rh-Di 3.1 3.2	Rh-Ar 3.1 3.3
	Di 3.2	Di-Qu 3.2 1.1	Di-Si 3.2 1.2	Di-Le 3.2 1.3	Di-Ic 3.2 2.1	Di-In 3.2 2.2	Di-Sy 3.2 2.3	Di-Rh 3.2 3.1	Di-Di 3.2 3.2	Di-Ar 3.2 3.3
	Ar 3.3	Ar-Qu 3.3 1.1	Ar-Si 3.3 1.2	Ar-Le 3.3 1.3	Ar-Ic 3.3 2.1	Ar-In 3.3 2.2	Ar-Sy 3.3 2.3	Ar-Rh 3.3 1.3	Ar-Di 3.3 3.2	Ar-Ar 3.3 3.3

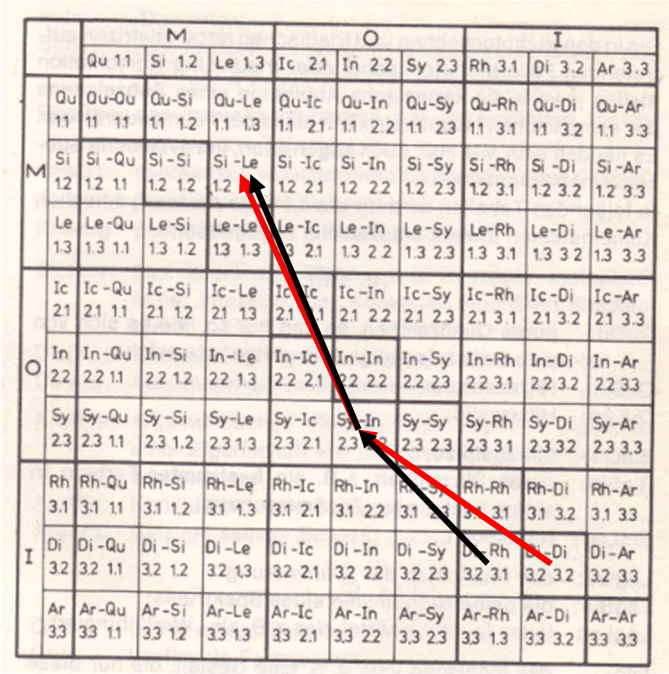
2.5. B → C

((3.2, 3.2), (2.3, 2.2), (1.2, 1.3))

↓

((3.2, 3.1), (2.3, 2.2), (1.2, 1.3)) =

(((id3, id2), (id3, α°)), ((id2, id3), (id2, id2)), ((id1, id2), (id1, id3)))



		M			O			I		
		Qu 1.1	Si 1.2	Le 1.3	Ic 2.1	In 2.2	Sy 2.3	Rh 3.1	Di 3.2	Ar 3.3
M	Qu 1.1	Qu-Qu 1.1 1.1	Qu-Si 1.1 1.2	Qu-Le 1.1 1.3	Qu-Ic 1.1 2.1	Qu-In 1.1 2.2	Qu-Sy 1.1 2.3	Qu-Rh 1.1 3.1	Qu-Di 1.1 3.2	Qu-Ar 1.1 3.3
	Si 1.2	Si-Qu 1.2 1.1	Si-Si 1.2 1.2	Si-Le 1.2 1.3	Si-Ic 1.2 2.1	Si-In 1.2 2.2	Si-Sy 1.2 2.3	Si-Rh 1.2 3.1	Si-Di 1.2 3.2	Si-Ar 1.2 3.3
	Le 1.3	Le-Qu 1.3 1.1	Le-Si 1.3 1.2	Le-Le 1.3 1.3	Le-Ic 1.3 2.1	Le-In 1.3 2.2	Le-Sy 1.3 2.3	Le-Rh 1.3 3.1	Le-Di 1.3 3.2	Le-Ar 1.3 3.3
O	Ic 2.1	Ic-Qu 2.1 1.1	Ic-Si 2.1 1.2	Ic-Le 2.1 1.3	Ic-Ic 2.1 2.1	Ic-In 2.1 2.2	Ic-Sy 2.1 2.3	Ic-Rh 2.1 3.1	Ic-Di 2.1 3.2	Ic-Ar 2.1 3.3
	In 2.2	In-Qu 2.2 1.1	In-Si 2.2 1.2	In-Le 2.2 1.3	In-Ic 2.2 2.1	In-In 2.2 2.2	In-Sy 2.2 2.3	In-Rh 2.2 3.1	In-Di 2.2 3.2	In-Ar 2.2 3.3
	Sy 2.3	Sy-Qu 2.3 1.1	Sy-Si 2.3 1.2	Sy-Le 2.3 1.3	Sy-Ic 2.3 2.1	Sy-In 2.3 2.2	Sy-Sy 2.3 2.3	Sy-Rh 2.3 3.1	Sy-Di 2.3 3.2	Sy-Ar 2.3 3.3
I	Rh 3.1	Rh-Qu 3.1 1.1	Rh-Si 3.1 1.2	Rh-Le 3.1 1.3	Rh-Ic 3.1 2.1	Rh-In 3.1 2.2	Rh-Sy 3.1 2.3	Rh-Rh 3.1 3.1	Rh-Di 3.1 3.2	Rh-Ar 3.1 3.3
	Di 3.2	Di-Qu 3.2 1.1	Di-Si 3.2 1.2	Di-Le 3.2 1.3	Di-Ic 3.2 2.1	Di-In 3.2 2.2	Di-Sy 3.2 2.3	Di-Rh 3.2 3.1	Di-Di 3.2 3.2	Di-Ar 3.2 3.3
	Ar 3.3	Ar-Qu 3.3 1.1	Ar-Si 3.3 1.2	Ar-Le 3.3 1.3	Ar-Ic 3.3 2.1	Ar-In 3.3 2.2	Ar-Sy 3.3 2.3	Ar-Rh 3.3 1.3	Ar-Di 3.3 3.2	Ar-Ar 3.3 3.3

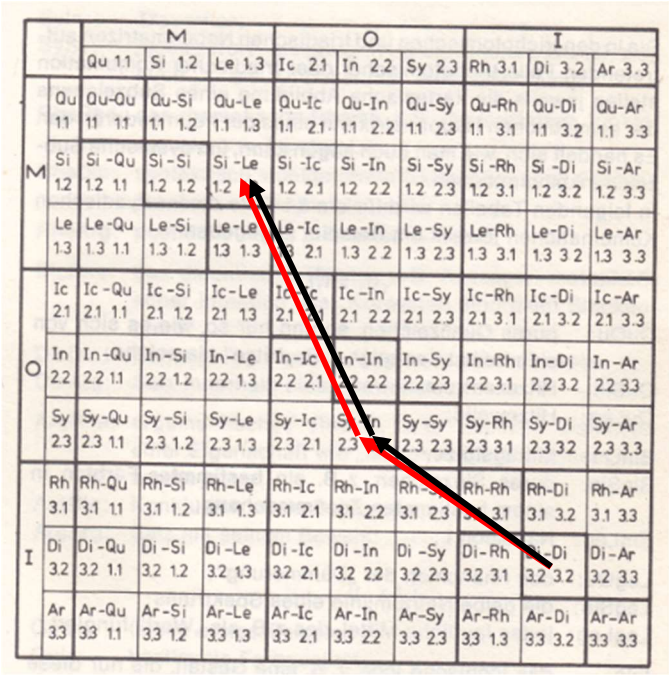
2.6. B → D

((3.2, 3.2), (2.3, 2.2), (1.2, 1.3))

↓

((3.2, 3.2), (2.3, 2.2), (1.2, 1.3)) =

(((id3, id2), (id3, id2)), ((id2, id3), (id2, di2)), ((id1, di2), (id1, id3)))



		M			O			I		
		Qu 1.1	Si 1.2	Le 1.3	Ic 2.1	In 2.2	Sy 2.3	Rh 3.1	Di 3.2	Ar 3.3
M	Qu 1.1	Qu-Qu 1.1 1.1	Qu-Si 1.1 1.2	Qu-Le 1.1 1.3	Qu-Ic 1.1 2.1	Qu-In 1.1 2.2	Qu-Sy 1.1 2.3	Qu-Rh 1.1 3.1	Qu-Di 1.1 3.2	Qu-Ar 1.1 3.3
	Si 1.2	Si-Qu 1.2 1.1	Si-Si 1.2 1.2	Si-Le 1.2 1.3	Si-Ic 1.2 2.1	Si-In 1.2 2.2	Si-Sy 1.2 2.3	Si-Rh 1.2 3.1	Si-Di 1.2 3.2	Si-Ar 1.2 3.3
	Le 1.3	Le-Qu 1.3 1.1	Le-Si 1.3 1.2	Le-Le 1.3 1.3	Le-Ic 1.3 2.1	Le-In 1.3 2.2	Le-Sy 1.3 2.3	Le-Rh 1.3 3.1	Le-Di 1.3 3.2	Le-Ar 1.3 3.3
O	Ic 2.1	Ic-Qu 2.1 1.1	Ic-Si 2.1 1.2	Ic-Le 2.1 1.3	Ic-Ic 2.1 2.1	Ic-In 2.1 2.2	Ic-Sy 2.1 2.3	Ic-Rh 2.1 3.1	Ic-Di 2.1 3.2	Ic-Ar 2.1 3.3
	In 2.2	In-Qu 2.2 1.1	In-Si 2.2 1.2	In-Le 2.2 1.3	In-Ic 2.2 2.1	In-In 2.2 2.2	In-Sy 2.2 2.3	In-Rh 2.2 3.1	In-Di 2.2 3.2	In-Ar 2.2 3.3
	Sy 2.3	Sy-Qu 2.3 1.1	Sy-Si 2.3 1.2	Sy-Le 2.3 1.3	Sy-Ic 2.3 2.1	Sy-In 2.3 2.2	Sy-Sy 2.3 2.3	Sy-Rh 2.3 3.1	Sy-Di 2.3 3.2	Sy-Ar 2.3 3.3
I	Rh 3.1	Rh-Qu 3.1 1.1	Rh-Si 3.1 1.2	Rh-Le 3.1 1.3	Rh-Ic 3.1 2.1	Rh-In 3.1 2.2	Rh-Sy 3.1 2.3	Rh-Rh 3.1 3.1	Rh-Di 3.1 3.2	Rh-Ar 3.1 3.3
	Di 3.2	Di-Qu 3.2 1.1	Di-Si 3.2 1.2	Di-Le 3.2 1.3	Di-Ic 3.2 2.1	Di-In 3.2 2.2	Di-Sy 3.2 2.3	Di-Rh 3.2 3.1	Di-Di 3.2 3.2	Di-Ar 3.2 3.3
	Ar 3.3	Ar-Qu 3.3 1.1	Ar-Si 3.3 1.2	Ar-Le 3.3 1.3	Ar-Ic 3.3 2.1	Ar-In 3.3 2.2	Ar-Sy 3.3 2.3	Ar-Rh 3.3 1.3	Ar-Di 3.3 3.2	Ar-Ar 3.3 3.3

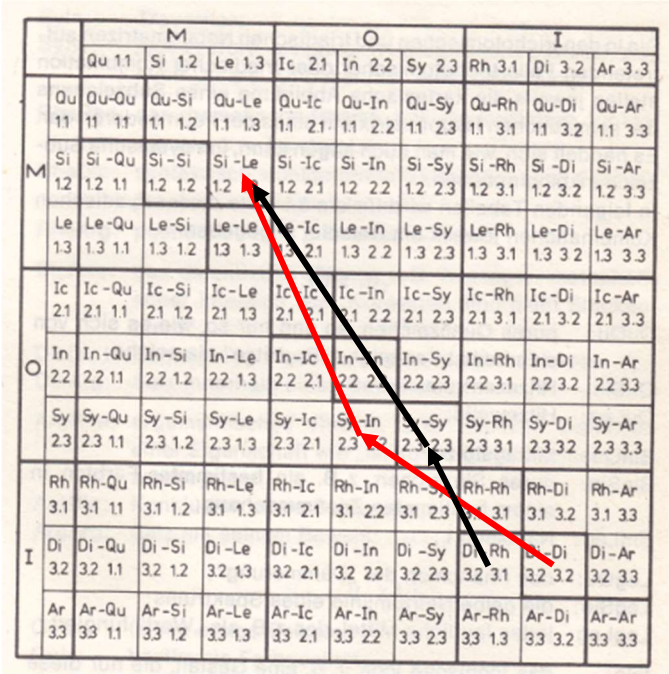
2.7. B → E

((3.2, 3.2), (2.3, 2.2), (1.2, 1.3))

↓

((3.2, 3.1), (2.3, 2.3), (1.2, 1.3)) =

(((id3, id2), (id3, α°)), ((id2, id3), (id2, β)), ((id1, id2), (id1, id3)))



		M			O			I		
		Qu 1.1	Si 1.2	Le 1.3	Ic 2.1	In 2.2	Sy 2.3	Rh 3.1	Di 3.2	Ar 3.3
M	Qu 1.1	Qu-Qu 1.1 1.1	Qu-Si 1.1 1.2	Qu-Le 1.1 1.3	Qu-Ic 1.1 2.1	Qu-In 1.1 2.2	Qu-Sy 1.1 2.3	Qu-Rh 1.1 3.1	Qu-Di 1.1 3.2	Qu-Ar 1.1 3.3
	Si 1.2	Si-Qu 1.2 1.1	Si-Si 1.2 1.2	Si-Le 1.2	Si-Ic 1.2 2.1	Si-In 1.2 2.2	Si-Sy 1.2 2.3	Si-Rh 1.2 3.1	Si-Di 1.2 3.2	Si-Ar 1.2 3.3
	Le 1.3	Le-Qu 1.3 1.1	Le-Si 1.3 1.2	Le-Le 1.3 1.3	Le-Ic 1.3 2.1	Le-In 1.3 2.2	Le-Sy 1.3 2.3	Le-Rh 1.3 3.1	Le-Di 1.3 3.2	Le-Ar 1.3 3.3
O	Ic 2.1	Ic-Qu 2.1 1.1	Ic-Si 2.1 1.2	Ic-Le 2.1 1.3	Ic-Ic 2.1 2.1	Ic-In 2.1 2.2	Ic-Sy 2.1 2.3	Ic-Rh 2.1 3.1	Ic-Di 2.1 3.2	Ic-Ar 2.1 3.3
	In 2.2	In-Qu 2.2 1.1	In-Si 2.2 1.2	In-Le 2.2 1.3	In-Ic 2.2 2.1	In-In 2.2 2.2	In-Sy 2.2 2.3	In-Rh 2.2 3.1	In-Di 2.2 3.2	In-Ar 2.2 3.3
	Sy 2.3	Sy-Qu 2.3 1.1	Sy-Si 2.3 1.2	Sy-Le 2.3 1.3	Sy-Ic 2.3 2.1	Sy-In 2.3 2.2	Sy-Sy 2.3 2.3	Sy-Rh 2.3 3.1	Sy-Di 2.3 3.2	Sy-Ar 2.3 3.3
I	Rh 3.1	Rh-Qu 3.1 1.1	Rh-Si 3.1 1.2	Rh-Le 3.1 1.3	Rh-Ic 3.1 2.1	Rh-In 3.1 2.2	Rh-Sy 3.1 2.3	Rh-Rh 3.1 3.1	Rh-Di 3.1 3.2	Rh-Ar 3.1 3.3
	Di 3.2	Di-Qu 3.2 1.1	Di-Si 3.2 1.2	Di-Le 3.2 1.3	Di-Ic 3.2 2.1	Di-In 3.2 2.2	Di-Sy 3.2 2.3	Di-Rh 3.2 3.1	Di-Di 3.2 3.2	Di-Ar 3.2 3.3
	Ar 3.3	Ar-Qu 3.3 1.1	Ar-Si 3.3 1.2	Ar-Le 3.3 1.3	Ar-Ic 3.3 2.1	Ar-In 3.3 2.2	Ar-Sy 3.3 2.3	Ar-Rh 3.3 1.3	Ar-Di 3.3 3.2	Ar-Ar 3.3 3.3

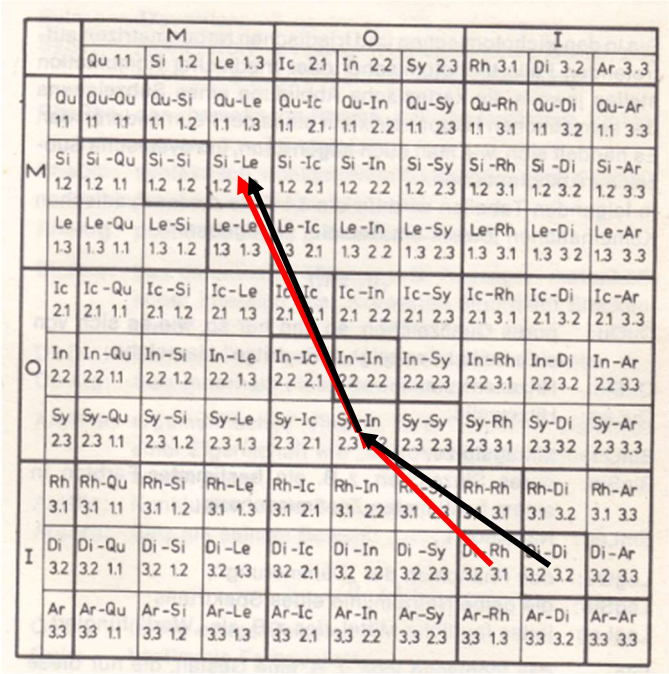
2.8. $C \rightarrow D$

$((3.2, 3.1), (2.3, 2.2), (1.2, 1.3))$

$\downarrow$

$((3.2, 3.2), (2.3, 2.2), (1.2, 1.3)) \quad =$

$(((id3, id2), (id3, \alpha)), ((id2, id3), (id2, id2)), ((id1, id2), (id1, id3)))$



		M			O			I		
		Qu 1.1	Si 1.2	Le 1.3	Ic 2.1	In 2.2	Sy 2.3	Rh 3.1	Di 3.2	Ar 3.3
M	Qu 1.1	Qu-Qu 1.1 1.1	Qu-Si 1.1 1.2	Qu-Le 1.1 1.3	Qu-Ic 1.1 2.1	Qu-In 1.1 2.2	Qu-Sy 1.1 2.3	Qu-Rh 1.1 3.1	Qu-Di 1.1 3.2	Qu-Ar 1.1 3.3
	Si 1.2	Si-Qu 1.2 1.1	Si-Si 1.2 1.2	Si-Le 1.2	Si-Ic 1.2 2.1	Si-In 1.2 2.2	Si-Sy 1.2 2.3	Si-Rh 1.2 3.1	Si-Di 1.2 3.2	Si-Ar 1.2 3.3
	Le 1.3	Le-Qu 1.3 1.1	Le-Si 1.3 1.2	Le-Le 1.3 1.3	Le-Ic 1.3 2.1	Le-In 1.3 2.2	Le-Sy 1.3 2.3	Le-Rh 1.3 3.1	Le-Di 1.3 3.2	Le-Ar 1.3 3.3
O	Ic 2.1	Ic-Qu 2.1 1.1	Ic-Si 2.1 1.2	Ic-Le 2.1 1.3	Ic-Ic 2.1 2.1	Ic-In 2.1 2.2	Ic-Sy 2.1 2.3	Ic-Rh 2.1 3.1	Ic-Di 2.1 3.2	Ic-Ar 2.1 3.3
	In 2.2	In-Qu 2.2 1.1	In-Si 2.2 1.2	In-Le 2.2 1.3	In-Ic 2.2 2.1	In-In 2.2 2.2	In-Sy 2.2 2.3	In-Rh 2.2 3.1	In-Di 2.2 3.2	In-Ar 2.2 3.3
	Sy 2.3	Sy-Qu 2.3 1.1	Sy-Si 2.3 1.2	Sy-Le 2.3 1.3	Sy-Ic 2.3 2.1	Sy-In 2.3 2.2	Sy-Sy 2.3 2.3	Sy-Rh 2.3 3.1	Sy-Di 2.3 3.2	Sy-Ar 2.3 3.3
I	Rh 3.1	Rh-Qu 3.1 1.1	Rh-Si 3.1 1.2	Rh-Le 3.1 1.3	Rh-Ic 3.1 2.1	Rh-In 3.1 2.2	Rh-Sy 3.1 2.3	Rh-Rh 3.1 3.1	Rh-Di 3.1 3.2	Rh-Ar 3.1 3.3
	Di 3.2	Di-Qu 3.2 1.1	Di-Si 3.2 1.2	Di-Le 3.2 1.3	Di-Ic 3.2 2.1	Di-In 3.2 2.2	Di-Sy 3.2 2.3	Di-Rh 3.2 3.1	Di-Di 3.2 3.2	Di-Ar 3.2 3.3
	Ar 3.3	Ar-Qu 3.3 1.1	Ar-Si 3.3 1.2	Ar-Le 3.3 1.3	Ar-Ic 3.3 2.1	Ar-In 3.3 2.2	Ar-Sy 3.3 2.3	Ar-Rh 3.3 1.3	Ar-Di 3.3 3.2	Ar-Ar 3.3 3.3

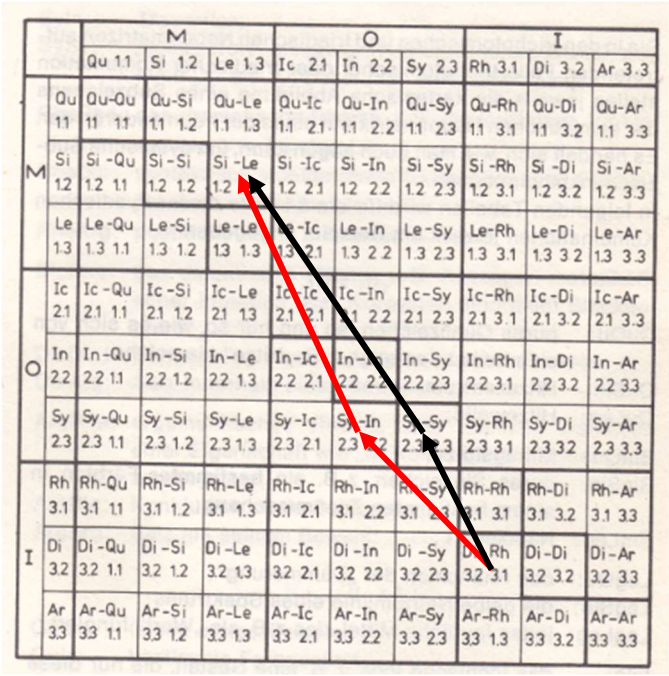
2.9. C → E

((3.2, 3.1), (2.3, 2.2), (1.2, 1.3))

↓

((3.2, 3.1), (2.3, 2.3), (1.2, 1.3)) =

(((id3, id2), (id3, id1)), ((id2, id3), (id2, β)), ((id1, id2), (id1, id3)))



		M			O			I		
		Qu 1.1	Si 1.2	Le 1.3	Ic 2.1	In 2.2	Sy 2.3	Rh 3.1	Di 3.2	Ar 3.3
M	Qu 1.1	Qu-Qu 1.1 1.1	Qu-Si 1.1 1.2	Qu-Le 1.1 1.3	Qu-Ic 1.1 2.1	Qu-In 1.1 2.2	Qu-Sy 1.1 2.3	Qu-Rh 1.1 3.1	Qu-Di 1.1 3.2	Qu-Ar 1.1 3.3
	Si 1.2	Si-Qu 1.2 1.1	Si-Si 1.2 1.2	Si-Le 1.2 1.3	Si-Ic 1.2 2.1	Si-In 1.2 2.2	Si-Sy 1.2 2.3	Si-Rh 1.2 3.1	Si-Di 1.2 3.2	Si-Ar 1.2 3.3
	Le 1.3	Le-Qu 1.3 1.1	Le-Si 1.3 1.2	Le-Le 1.3 1.3	Le-Ic 1.3 2.1	Le-In 1.3 2.2	Le-Sy 1.3 2.3	Le-Rh 1.3 3.1	Le-Di 1.3 3.2	Le-Ar 1.3 3.3
O	Ic 2.1	Ic-Qu 2.1 1.1	Ic-Si 2.1 1.2	Ic-Le 2.1 1.3	Ic-Ic 2.1 2.1	Ic-In 2.1 2.2	Ic-Sy 2.1 2.3	Ic-Rh 2.1 3.1	Ic-Di 2.1 3.2	Ic-Ar 2.1 3.3
	In 2.2	In-Qu 2.2 1.1	In-Si 2.2 1.2	In-Le 2.2 1.3	In-Ic 2.2 2.1	In-In 2.2 2.2	In-Sy 2.2 2.3	In-Rh 2.2 3.1	In-Di 2.2 3.2	In-Ar 2.2 3.3
	Sy 2.3	Sy-Qu 2.3 1.1	Sy-Si 2.3 1.2	Sy-Le 2.3 1.3	Sy-Ic 2.3 2.1	Sy-In 2.3 2.2	Sy-Sy 2.3 2.3	Sy-Rh 2.3 3.1	Sy-Di 2.3 3.2	Sy-Ar 2.3 3.3
I	Rh 3.1	Rh-Qu 3.1 1.1	Rh-Si 3.1 1.2	Rh-Le 3.1 1.3	Rh-Ic 3.1 2.1	Rh-In 3.1 2.2	Rh-Sy 3.1 2.3	Rh-Rh 3.1 3.1	Rh-Di 3.1 3.2	Rh-Ar 3.1 3.3
	Di 3.2	Di-Qu 3.2 1.1	Di-Si 3.2 1.2	Di-Le 3.2 1.3	Di-Ic 3.2 2.1	Di-In 3.2 2.2	Di-Sy 3.2 2.3	Di-Rh 3.2 3.1	Di-Di 3.2 3.2	Di-Ar 3.2 3.3
	Ar 3.3	Ar-Qu 3.3 1.1	Ar-Si 3.3 1.2	Ar-Le 3.3 1.3	Ar-Ic 3.3 2.1	Ar-In 3.3 2.2	Ar-Sy 3.3 2.3	Ar-Rh 3.3 1.3	Ar-Di 3.3 3.2	Ar-Ar 3.3 3.3

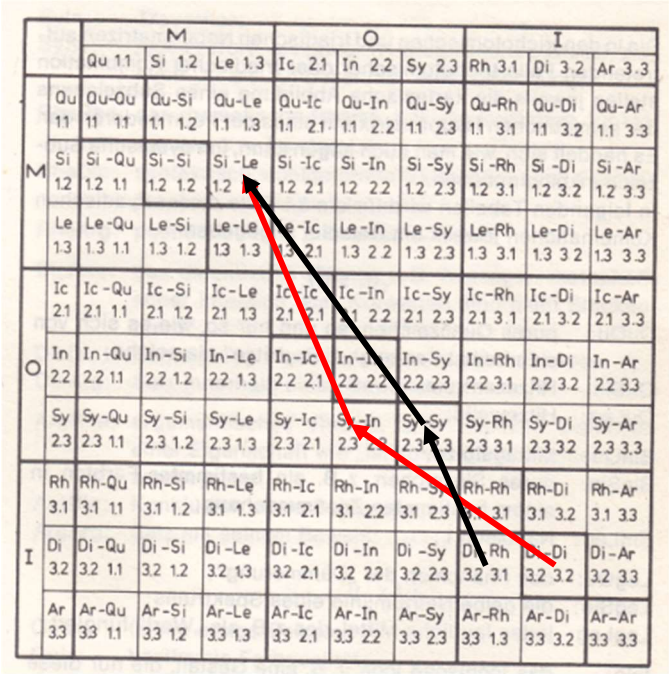
2.10. D → E

((3.2, 3.2), (2.3, 2.2), (1.2, 1.3))

↓

((3.2, 3.1), (2.3, 2.3), (1.2, 1.3)) =

(((id3, id2), (id3, α°)), ((id2, id3), (id2, β)), ((id1, id2), (id1, id3)))



		M			O			I		
		Qu 1.1	Si 1.2	Le 1.3	Ic 2.1	In 2.2	Sy 2.3	Rh 3.1	Di 3.2	Ar 3.3
M	Qu 1.1	Qu-Qu 1.1 1.1	Qu-Si 1.1 1.2	Qu-Le 1.1 1.3	Qu-Ic 1.1 2.1	Qu-In 1.1 2.2	Qu-Sy 1.1 2.3	Qu-Rh 1.1 3.1	Qu-Di 1.1 3.2	Qu-Ar 1.1 3.3
	Si 1.2	Si-Qu 1.2 1.1	Si-Si 1.2 1.2	Si-Le 1.2 1.3	Si-Ic 1.2 2.1	Si-In 1.2 2.2	Si-Sy 1.2 2.3	Si-Rh 1.2 3.1	Si-Di 1.2 3.2	Si-Ar 1.2 3.3
	Le 1.3	Le-Qu 1.3 1.1	Le-Si 1.3 1.2	Le-Le 1.3 1.3	Le-Ic 1.3 2.1	Le-In 1.3 2.2	Le-Sy 1.3 2.3	Le-Rh 1.3 3.1	Le-Di 1.3 3.2	Le-Ar 1.3 3.3
O	Ic 2.1	Ic-Qu 2.1 1.1	Ic-Si 2.1 1.2	Ic-Le 2.1 1.3	Ic-Ic 2.1 2.1	Ic-In 2.1 2.2	Ic-Sy 2.1 2.3	Ic-Rh 2.1 3.1	Ic-Di 2.1 3.2	Ic-Ar 2.1 3.3
	In 2.2	In-Qu 2.2 1.1	In-Si 2.2 1.2	In-Le 2.2 1.3	In-Ic 2.2 2.1	In-[illegible] 2.2 2.2	In-Sy 2.2 2.3	In-Rh 2.2 3.1	In-Di 2.2 3.2	In-Ar 2.2 3.3
	Sy 2.3	Sy-Qu 2.3 1.1	Sy-Si 2.3 1.2	Sy-Le 2.3 1.3	Sy-Ic 2.3 2.1	Sy-In 2.3 2.2	Sy-Sy 2.3 2.3	Sy-Rh 2.3 3.1	Sy-Di 2.3 3.2	Sy-Ar 2.3 3.3
I	Rh 3.1	Rh-Qu 3.1 1.1	Rh-Si 3.1 1.2	Rh-Le 3.1 1.3	Rh-Ic 3.1 2.1	Rh-In 3.1 2.2	Rh-Sy 3.1 2.3	Rh-Rh 3.1 3.1	Rh-Di 3.1 3.2	Rh-Ar 3.1 3.3
	Di 3.2	Di-Qu 3.2 1.1	Di-Si 3.2 1.2	Di-Le 3.2 1.3	Di-Ic 3.2 2.1	Di-In 3.2 2.2	Di-Sy 3.2 2.3	Di-Rh 3.2 3.1	Di-Di 3.2 3.2	Di-Ar 3.2 3.3
	Ar 3.3	Ar-Qu 3.3 1.1	Ar-Si 3.3 1.2	Ar-Le 3.3 1.3	Ar-Ic 3.3 2.1	Ar-In 3.3 2.2	Ar-Sy 3.3 2.3	Ar-Rh 3.3 1.3	Ar-Di 3.3 3.2	Ar-Ar 3.3 3.3

Literatur

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

Steffen, Werner, Zum semiotischen Aufbau ästhetischer Zustände von Bildwerken. Diss. Stuttgart 1981

Toth, Alfred, Das vollständige ontotopologische System I-II. In: Electronic Journal for Mathematical Semiotics 2015

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