Rudolf Kaehr
(1942-2016)

Title

The Book of Diamonds: How to Compose?

Archive-Number / Categories

1_28 / K04

Publication Date

2007

Keywords

Category, Proemiality, Chiasm and Diamonds, Polycontexturality, Chiasm of composition

Disciplines

Artificial Intelligence and Robotics, Computer Science, Cybernetics, Social Sciences

Abstract

Category, Proemiality, Chiasm and Diamonds - Categorical composition of morphisms - Proemiality of composition - Chiasm of composition - Diamond of composition - Compositions of Diamonds - Diamondization of diamonds - Composing the answers of "How to compose?"

The Book of Diamonds

– DRAFT –

Rudolf Kaehr

ThinkArt Lab Glasgow 2007

http://www.thinkartlab.com

How to compose?

How to compose?

How to compose?

1 Category, Proemiality, Chiasm and Diamonds

From a pattern of cosmic law to a figure of speech to the structure of cosmos as the pattern of the script beyond speech.

To put the different terminologies together I'm resuming the analysis of composition, again.

Chiasm is for Chiasm, too

"Emileigh Rohn is a solo artist who produces the dark industrial electronic music project *Chiasm* sold by COP International records."

"At the age of five, Emileigh Rohn began taking piano lessons from her church organist, Mildred Benson, and eventually began singing solos in church. By the age of 13 she received a Casiotone keyboard and began experimenting with electronic music."
http://www.last.fm/music/Chiasm/+wiki

Chiasm, which *"began in 1998 when Rohn began to entirely produce her own music"*, named *"Embryonic"* is composing in its dark *"experimental/industrial"* sound structures Emileigh Rohn, the artist of Chiasm, which began *"At the age of five"*, when *"Emileigh Rohn began taking piano lessons ...and eventually began singing solos in church."*, Emileigh began to be involved into the chiastic co-creation of Rohn and Chiasm, together. Her beginning hasn't ended to create and re-create Chiasm and Emileigh Rohn, again. Tomorrow, July the 7th 2007 at The Labyrinth/Detroit/USA.
http://www.chiasm.org/

As a guideline to this *summary* of the modi of beginnings and endings, and their compositions, the diagram of chiasm as developed in the texts to polycontextural logics, might be of help to lead the understanding of polycontextural logics and their chiasms.

On page 55 of *Chuang-tzu: The Inner Chapters* it is said,

"There is 'beginning', there is 'not yet having begun having a beginning'. There is 'there not yet having begun to be that "not yet having begun having a beginning"'. There is 'something', there is 'nothing'. There is 'not yet having begun being without something'. There is 'there not yet having begun to be that "not yet having begun being without something'."

Zhuangzi quips, "While we dream we do not know that we are dreaming, and in the middle of a dream interpret a dream within it; not until we wake do we know that we were dreaming. Only at the ultimate awakening shall we know that this is the ultimate dream".

"Last night Chuang Chou dreamed he was a butterfly, spirits soaring he was a butterfly (is it that in showing what he was he suited his own fancy?), and did not know about Chou. When all of a sudden he awoke, he was Chou with all his wits about him. He does not know whether he is Chou who dreams he is a butterfly or a butterfly who dreams he is Chou. Between Chou and the butterfly there was necessarily a dividing; just this is what is meant by the transformation of things".

Chiastic structures

“The Intertwining the Chiasm:

If it is true that as soon as philosophy declares itself to be reflection or coincidence it prejudges what it will find, then once again it must recommence everything, reject the instruments reflection and intuition had provided themselves, and install itself in a locus where they have not yet been distinguished, in experiences that have not yet been “worked over,” that offer us all at once, pell-mell, both “subject” and “object,” both existence and essence, and hence give philosophy resources to redefine them.” (Merleau-Ponty 130).

"The second quotation is a selection from the Zhuangzi.

It states, “Cook Ding was cutting up an ox for Lord Wen-Hui. At every touch of his hand, every heave of his shoulder, every move of his feet, every thrust of his knee-zip! Zoop! He slithered the knife along with a zing, and all was in perfect rhythm, as though he were performing the dance of the Mulberry Grove or keeping time to the Ching-shou music. ‘Ah, this is marvelous!’ said Lord Wen-Hui. ‘Imagine skill reaching such heights!’ Cook Ting laid down his knife and replied, ‘What I care about is the [way], which goes beyond skill. When I first began cutting up oxen, all I could see was the ox itself. After three years I no longer saw the whole ox. And now-now I go at it by spirit and don’t look with my eyes. Perception and understanding have come to a stop and spirit moves where it wants. I go along with the natural makeup, strike in the big hollows, guide the knife through the big openings, and follow things as they are’.”

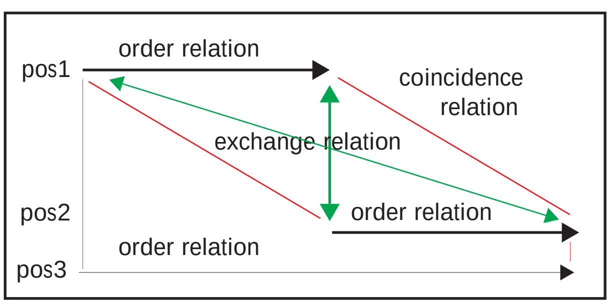
http://www.uwlax.edu/urc/JUR-online/PDF/2004/durski.pdf

"Chiastic structures are sometimes called *palistrophes*, *chiasms*, *symmetric* structures, *ring* structures, or *concentric* structures."

http://en.wikipedia.org/wiki/Chiastic_structure

The *optic chiasm* (Greek χιασμα, "crossing", from the Greek χλαζειν 'to mark with an X', after the Greek letter "χ'', chi)

Preliminary travel guide to chiasm



The green arrows are symbolizing the over-cross position of terms, *exchange* relation, involved in the polycontextural approach to chiasm.

To enable the chiasm to function, the *coincidence* relations, which are securing categorial sameness, have to be matched. In the rhetoric form "winter becomes summer and summer becomes winter" the terms "winter" ("summer") in the first and "winter" ("summer") in the second part of the sentence are the same, that is they have to match their categorial sameness. Hence the figure of its crossed terms is "ABBA". The *order* relations are representing the difference and order between "winter" and "summer". Both order relations are distributed over 2 positions (pos1, pos2). A summary is given at position pos3 with the 3. order relation, representing the seasonal *change* of winter and summer as such.

Chiastic Rhetoric

"In rhetoric, chiasmus is the figure of speech in which two clauses are related to each other through a reversal of structures in order to make a larger point; that is, the two clauses display inverted parallelism. Chiasmus was particularly popular in Latin literature, where it was used to articulate balance or order within a text."
http://en.wikipedia.org/wiki/Chiasmus

Depending on the interpretation of the coincidence relations between the crossed terms, A, A' and B, B', different rhetoric figures can be realized.

Antanaclasis

"We must all hang together, or assuredly we shall all hang separately." —Benjamin Franklin

Hence, in Bejamin Franklin's figure of *antanaclasis* the terms are changing the meaning of its crossed terms, but not its phonetics. That is, in "hang together" vs. "hang seperatedly", the terms "hang" are phonetically in a coincidence, but different in meaning. The different meanings are even in some sense in an opposition.

Antimetabole

Marx wrote:
"It is not the consciousness of men that determines their being, but, on the contrary, their social being that determines their consciousness".

"We didn't land on Plymouth Rock, the rock was landed on us."
Malcolm X, The Ballot or the Bullet, Washington Heights, NY, March 29, 1964.

Zeugma

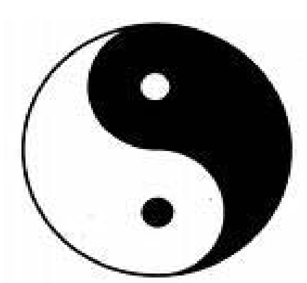
Zeugma (from the Greek word "ζευγμα", meaning "yoke") is a figure of speech describing the joining of two or more parts of a sentence with a common verb or noun. A zeugma employs both ellipsis, the omission of words which are easily understood, and parallelism, the balance of several words or phrases.

Syllepsis

Syllepsis is a particular type of zeugma in which the clauses are not parallel either in meaning or grammar. The governing word may change meaning with respect to the other words it modifies.

"You held your breath and the door for me." Alanis Morissette, Head over Feet

Yin-Yang symbol of change, Yijing

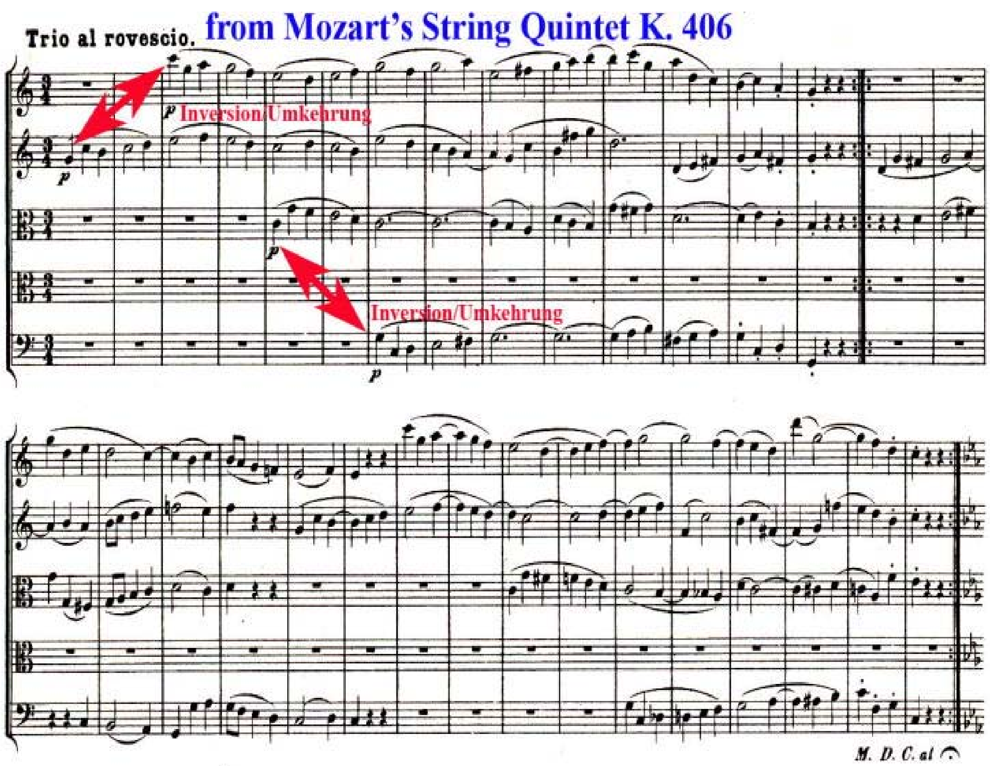


Taijitu, the traditional symbol representing the forces of yin and yang.

Obviously, from the point of view developed in this paper, the *taijitu* is not simply a binary polarity, dichotomy, duality or cyclic complementarity, nor a part-whole merological figure, but a *chiasm* with its 4 elements (black=yin, white=yang, big, small) and its 6 relations between the 4 elements.

http://www.kolahstudio.com/Underground/?p=153
http://them.polylog.org/3/amb-en.htm
http://www.sjsu.edu/faculty/bmou/Default.htm
http://www.chiasmus.com/whatischiasmus.shtml

Chiastic Music



Patterns of Musical Chiasms at the Grove Music Online

Thomas Braatz wrote (April 5, 2006):
Rovescio (2 meanings), retrograde, palindrome, etc.

"In the meantime, here are some explanations I have extracted from the Grove Music Online which might help in *'coming to terms with these terms'*:

Al rovescio

(It.: 'upside down', 'back to front').

A term that can refer either to Inversion or to Retrograde motion. Haydn called the minuet of the Piano Sonata in A h XVI:26 Minuetto al rovescio: after the trio the minuet is directed to be played backwards (retrograde motion). In the Serenade for Wind in C minor K388/384a, Mozart called the trio of the minuet Trio in canone al rovescio, referring to the fact that the two oboes and the two bassoons are in canon by inversion.

Retrograde

(Ger. 'Krebsgang', from Lat. 'cancrizans': 'crab-like').

A succession of notes played backwards, either retaining or abandoning the rhythm of the original. It has always been regarded as among the more esoteric ways of extending musical structures, one that does not necessarily invite the listener's appreciation. In the Middle Ages and Renaissance it was applied to cantus firmi, sometimes with elaborate indications of rhythmic organization given in cryptic Latin inscriptions in the musical manuscripts; rarely was it intended to be detected from performance.

Cancrizans

(Lat.: 'crab-like').

By tradition 'cancrizans' signifies that a part is to be heard backwards (see Retrograde); crabs in fact move sideways, a mode of perambulation that greatly facilitates reversal of direction.

Palindrome

A piece or passage in which a Retrograde follows the original (or 'model') from which it is derived (see Mirror forms). The retrograde normally follows the original directly. The term 'palindrome' may be applied exclusively to the retrograde itself, provided that the original preceded it. In the simplest kind of palindrome a melodic line is followed by its 'cancrizans', while the harmony (if present) is freely treated. The finale of Beethoven's Hammerklavier Sonata op.106 provides an example. Unlike the 'crab canon', known also as 'canon cancrizans' or 'canon al rovescio', in which the original is present with the retrograde, a palindrome does not present both directional forms simultaneously. Much rarer than any of these phenomena is the true palindrome, where the entire fabric of the model is reversed, so that the harmonic progressions emerge backwards too.

http://www.bach-cantatas.com/Topics/Chiasm.htm

"ABA is a palindrome: you can read it both ways, but it is not a chiasm. AB:BA is a chiasm, and so is of course AB:C:BA. Both are palindromes too, because they are dreadfully abstract. But Recitative-Aria-Chorus-Aria-Recitative will be a palindrome only if both your recitatives and both your recitatives are similar, which I would definitely advise against. The chiasm is fun only because you realize that you have two pairs facing each other that decided to dance a little step instead of mirroring each other blandly."

2 Categorical composition of morphisms

A action from A to B can be considered as a mapping or morphism, symbolized by an arrow from A to B. In this sense, morphisms are universal, they occur everywhere. But morphisms (mappings) don't occur in isolation, they are composed together to interesting complexions. This highly general notion of morphism and composition of morphisms is studied in *Category Theory*.

"... category theory is based upon one primitive notion – that of composition *of morphisms." D. E. Rydeheard*

What is a morphism? And how are morphisms composed?

$$morph(A;\alpha,\ B;\omega),\ or\ as\ a\ graph,$$
$$morph : (A,\ \alpha) \longrightarrow (B,\ \omega)$$

"In mathematics, a *morphism* is an abstraction of a structure-preserving mapping between two mathematical structures.
The most common example occurs when the process is a function or map which preserves the structure in some sense.

There are two operations defined on every morphism, the *domain* (or source) and the *codomain* (or target). Morphisms are often depicted as arrows from their domain to their codomain, e.g. if a morphism f has domain X and codomain Y, it is denoted f : X –> Y. The set of all morphisms from X to Y is denoted $hom_C(X,Y)$ or simply hom(X, Y) and called the *hom-set* between X and Y.

$$\begin{tikzcd} X \arrow[r, "f"] \arrow[dr, "g \circ f"'] & Y \arrow[d, "g"] \\ & Z \end{tikzcd}$$

For every three objects X, Y, and Z, there exists a binary operation hom(X, Y) x hom(Y, Z) –> hom(X, Z) called *composition*.
The composite of f : X –> Y and g : Y –> Z is written gof or gf (Some authors write it as fg.) Composition of morphisms is often denoted by means of a *commutative* diagram."

Hence, commutativity means, to operate from X to Y and from Y to Z, is the same as to operate from X to Z.

"Morphisms must satisfy two *axioms*:
1. IDENTITY:
for every object X, there exists a morphism idX : X –> X called the identity morphism on X, such that for every morphism f : A –> B we have id_B o f = f o Id_A.

2. ASSOCIATIVITY:
h o (g o f) = (g o h) o f whenever the operations are defined."

http://en.wikipedia.org/wiki/Morphism

The composition of morphisms (arrows) is defined by the *coincidence* of codomain (cod) and domain (dom) of the morphism to compose. That is, cod(f) = dom(g). Or more abstract, the *matching rules* of the morphisms f and g have to be fulfilled to compose the morphisms f and g as the composite g o f.

Obviously, morphisms (arrows) are modelled in the chiastic approach as order relations. Hence, the focus of this categorial approach of composition are the matching (coincidence) rules. And not any exchange relations between codomain and domain of composed morphisms, like in the chiastic model. Instead of an exchange relation, a partial coincidence relation (matching) is used to compose morphisms.

$$\begin{bmatrix} \alpha_1 \xrightarrow{f} \omega_1 \ o \ \alpha_2 \xrightarrow{g} \omega_2 \\ \alpha_3 \xrightarrow{\qquad fg \qquad} \omega_3 \end{bmatrix}$$

$$is\ COMP\ iff\ \omega_1 \triangleq \alpha_2$$

Also not in focus is the distinction of the domain of the first and the codomain of the second morphism as *opposite* properties.

That is, neither exchange nor coincidence relations are considered as such in the categorial approach to the composition of morphisms. This may be called a *local* approach to composition.

An explicit definition of the composition of morphisms is given by the following diagram and its matching conditions. Here, the distinction between objects, A, B, and the domain, codomain properties, alpha (α), omega (ω), are included.

$$\begin{array}{c} (A^1, \alpha_1) \xrightarrow{R_A} (B^1, \omega_1) \ o \ (A^2, \alpha_2) \xrightarrow{R_B} (B^2, \omega_2) \\ (A^1, \alpha_3) \xrightarrow{R_{AB}} (B^2, \omega_3) \end{array} \qquad \begin{bmatrix} \omega_1 \simeq \alpha_2 \\ A^2 \triangleq B^1 \\ (A^1, \alpha_1) = (A^1, \alpha_3) \\ (B^2, \omega_2) = (B^2, \omega_3) \end{bmatrix}$$

Hence, not only the codomain B1 and the domain A2 as objects have to coincide, but also the domain "alpha2" (α2) and the codomain "omega1" (ω2) as functions have to match. The distinction of objects and functions (aspects) of morphisms is not strictly used in category theory. Obviously, the commutativity of the diagram has to fulfil, additionally, the matching conditions for (A1, α1) with (A1, α3) and (B2, ω2) with (B2, ω3).

Associativity

The associativity rules for compositions are easily pictured by the following diagram, which is reducing the notation to its essentials.

In a formula, for all arrows f, g and h: (f o g) o h = f o (g o h).

$$\begin{bmatrix} \alpha_1 \xrightarrow{f} \omega_1 \ o \ \alpha_2 \xrightarrow{g} \omega_2 \ o \ \alpha_4 \xrightarrow{h} \omega_4 \\ \alpha_3 \xrightarrow{\qquad fg \qquad} \omega_3 \\ \alpha_5 \xrightarrow{\qquad gh \qquad} \omega_5 \\ \alpha_6 \xrightarrow{\qquad\qquad fgh \qquad\qquad} \omega_6 \end{bmatrix}$$

To suggest a picture of the diamond way of thinking, to be introduced, the graph may take this form:

$$\begin{bmatrix} \alpha_1 \xrightarrow{f} \omega_1 \ o \ \alpha_2 \xrightarrow{g} \omega_2 \ o \ \alpha_4 \xrightarrow{h} \omega_4 \\ \alpha_3 \xrightarrow{fg} \omega_3 \quad \alpha_5 \xrightarrow{gh} \omega_5 \\ \alpha_6 \xrightarrow{fgh} \omega_6 \end{bmatrix}$$

This is the beginning only. All further steps from *morphisms*, to *functors*, to *natural transformations*, etc. are following "naturally" the laws of composition.

3 Proemiality of composition

Proemiality of composition in the sense of Gotthard Gunther is focusing on the *exchange* relationship between morphisms as *order* relations over different levels. Hence the inverse exchange relation between the levels was not specially thematized. Also not in focus at all are the coincidence relations responsible for categorial matching of morphisms beyond commutativity.

„However, if we let the relator assume the place of a relatum the exchange is not mutual. The relator may become a relatum, not in the relation for which it formerly established the relationship, but only relative to a relationship of higher order.

And vice versa the relatum may become a relator, not within the relation in which it has figured as a relational member or relatum but only relative to relata of lower order.

If:

R_{i+1}(xi, yi) *is given and the relatum (x or y) becomes a relator, we obtain*
R_i *(xi-1, yi-1) where Ri =* x_i *or* y_i*. But if the relator becomes a relatum, we obtain*
R_{i+2}*(xi+1, yi+1) where* $R_{i+1} = x_{i+1}$ *or* y_{i+1}*. The subscript i signifies higher or lower logical orders.*

We shall call this connection between relator and relatum the 'proemial' relationship*, for it 'pre-faces' the symmetrical exchange relation and the ordered relation and forms, as we shall see, their common basis.“*

"But the exchange is not a direct one. If we switch in the summer from our snow skis to water skis and in the next winter back to snow skis, this is a direct exchange. But the switch in the proemial relationship always involves not two relata but four!" (Gunther)

On focusing on the *activity* of the proemial relationship, a connection to kenogrammatics is established.

"This author has, in former publications, introduced the distinction between value structures and the kenogrammatic structure of empty places which may or may not have changing value occupancies.

The proemial relation belongs to the level of the *kenogrammatic* structure because it is a mere potential which will become an actual relation only as either symmetrical exchange relation or non-symmetrical ordered relation. It has one thing in common with the classic symmetrical exchange relation, namely, what is a relator may become a relatum and what was a relatum may become a relation." (Gunther)

Gunther's Proemiality

What wasn't yet considered in this approach Gunther's to the proemial relationship are the "acceptional" relations, also called the mediation systems, between the different levels of proemiality. A morphism based on a kind of coincidence relation was allowed only for the mediation of his polycontextural logics but didn't have a representation in the introduction of his proemial relationship.

Graph formalization of Proemiality as a cascadic chiasm

The graph of Gunther's description was given in my *Materialien* as a cascade.

"The exchange which the proemial relation (R^{pr}) effects is one between higher and lower relational order." (Gunther)

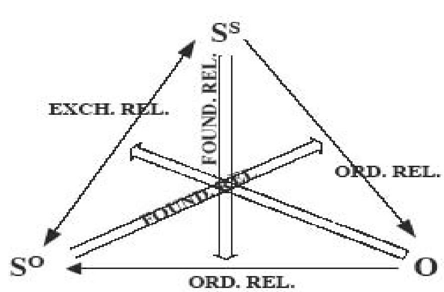
$$\mathbf{PR}\left(\mathbf{R}_{i+1}, \mathbf{R}_{i}, \mathbf{x}_{i+1}, \mathbf{x}_{i}\right)::$$

$$\begin{array}{llll}
m-1: & & & R_i \longrightarrow x_{i-1} \\
 & & & \Updownarrow \\
m: & & R_{i+1} \longrightarrow x_i & \\
 & & \Updownarrow & \\
m+1: & R_{i+2} \longrightarrow x_{i+1} & &
\end{array}$$

The proemial relation is not considering the categorial coincidence relations as such, nor the inverse exchange relation. The movements, up and down, in the cascade are ruled by the indexes of the levels (m) and not by an additional inverse exchange relation.

> "We stated that the proemial relationship presents itself as an interlocking mechanism of exchange and order. This gave us the opportunity to look at it in a double way. We can either say that proemiality is an exchange founded on order; but since the order is only constituted by the fact that the exchange either transports a relator (as relatum) to a context of higher logical complexities or demotes a relatum to a lower level, we can also define proemiality as an ordered relation on the base of an exchange." (Gunther)

This reading of the proemial relationship is thematization the upwards and downward movement of proemiality. What is missing is the insight into the simultaneity of both movements of upwards as construction and downwards as deconstruction at once. Because Gunther introduced one and only one exchange relation per transition (transport/remote) of reflection such a simultaneity is systematically excluded. By another, earlier 1966, approach to the phenomen of proemiality, Gunther is introducing an additional *"founding relation"*, which seems to close the pattern of reflection to some degree by including the objects of the relations into the interplay. The schemes has the following structure:



"an *exchange* relation between logical positions
an *ordered* relation between logical positions
a *founding* relation which holds between the member of a relation and a relation itself."

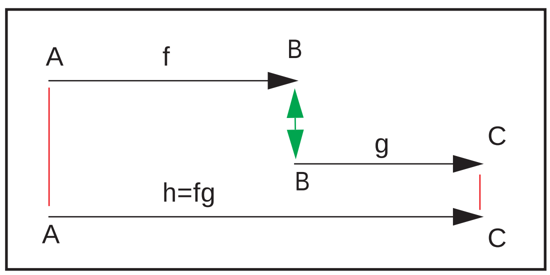
O=object
So= objective subject (Thou)
Ss= subjective subject (I).

Hence, the interlocking mechanism of order and exchange relations are founded by the founding relation, which is omitted in the later introduction of proemiality.

> "We are now able to establish the fundamental law that governs the connections between exchange-, ordered- and founding-relation. We discover first in classic two-valued logic that affirmation and negation form an ordered relation. The positive value implies itself and only itself. The negative value implies itself and the positive. In other words: affirmation is never anything but implicate and negation is always implication. This is why we speak here of an ordered relation between the implicate and the implicand. The name of this relation in classic two-valued logic is - inference."
>
> "Thus we may say: the founding-relation is an exchange-relation based on an ordered-relation. But since the exchange-relations can establish themselves only between ordered relations we might also say: the founding-relation is an ordered relation based on the succession of exchange-relations. When we stated that the founding-relation establishes subjectivity we referred to the fact that a self-reflecting system must always be: self-reflection of (self- and hetero-reflection)."
>
> Gunther, Formal Logic, Totality and The Super-additive Principle, 1966

Gunther's Proemiality and Super-additivity of composition

That an m-valued logic is producing s(m)-valued subsystems is emphazised and based on the coincidence relations in the sense of commutativity.



This topic is constant in Gunther's studies to polycontextural logics. But it is not included in the definition of his proemial relationship.

Open and closed proemiality

In my paper *Materialien 1973-75*, I introduced the distinction between open and closed proemial relationships.

$$Open - PR: \quad PR\left(PR^{(m)}\right) = PR^{(m+1)}$$
$$Closed - PR: PR\left(PR^{(m)}\right) = PR^{(m)}$$

It seems that the concept of a *closed proemiality* is including the inverse exchange relation to guaranty the circularity of the chiasm. Hence, this thematization of proemiality is involving two exchange relations in the transition from one level of reflection to the next; and backwards at once.

The open proemial relationship is a cascade from step to step of the iteration. It can be involved in one or in two exchange relations at each transition.

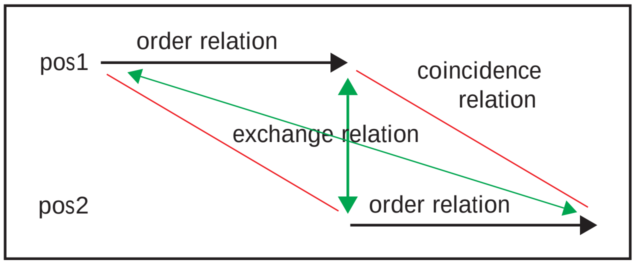
4 Chiasm of composition

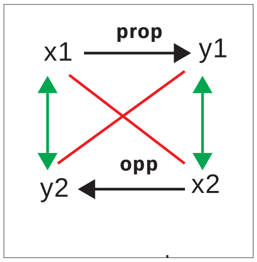
The chiasm of composition is reflecting all parts involved into the composition.

In this sense, finiteness and closeness of the operation of composition are established by the interplay of two exchange and two coincidence relations over two morphisms as order relations, distributed over two positions.

4.1 Proemiality pure

This kind of chiasm is not a simple cascade but a circular structure involving two exchange relations.





coinc (x y)	***exch (x y)***	***ord (x y)***
x1 coinc x2	*x1 exch y2*	*x1 ord y1*
y1 coinc y2	*y1 exch x2*	*x2 ord y2*

This table is resuming the relations of the chiasm using the variables x and y for the objects, that is, the domain and codomain of the morphisms, defined by the order relations.

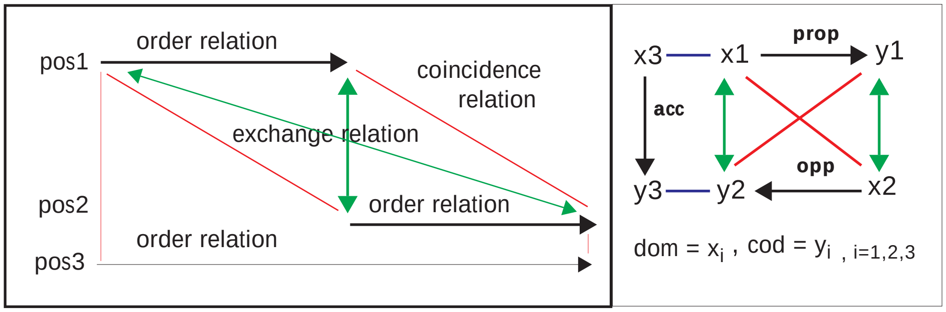
A metaphor: From chiasm to diamond

"I wish from you that you wish from me
what I wish from you that you wish from me.
Do you?"

"Ich wünsche mir von dir, dass du dir wünschst von mir,
was ich mir wünsche von dir.
Und du?"

This formula of you and me is celebrating the suspension of the *pure* chiasm. It is not making a decision about to what the wish is aimed. With such a decision, a new order relation, mediating the dynamics of the pure chiasm, has to be installed. This is producing the *acceptional* chiasm. The dynamics of suspension is not interrupted by the introduction of an acceptional order relation, but it gets a place where the hidden content of the dynamics can be realized. Nevertheless, this acceptional chiasm, which is incorporating the pure chiasm, is still blind for the necessity of a possible surprise by the unpredictable otherness. Such a otherness is complementary to the you/me-chiasms and the our-acceptionality. Thus, it has, formally, to be an order relation in inverse direction, additional to the acceptional order relation. Hence, it is called *rejectional* order relation. With this together, the *diamond* chiasm, i.e., the diamond is created.

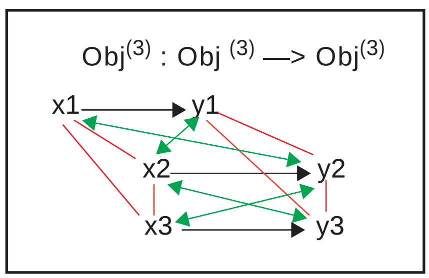
4.2 Proemiality with acceptional systems



Compositions as chiasm are strongly global or holistic, like the categorical and proemial concept of composition, but the chiastic concept is still excluding the hetero-morphisms of rejectionality.

coinc (x y)	***exch (x y)***	***ord (x y)***
x1 coinc x2	*x1 exch y2*	*x1 ord y1*
y1 coinc y2	*y1 exch x2*	*x2 ord y2*
x1 coinc x3		*x3 ord y3*
y2 coinc y3		

More detailed analysis of the chiastic proemial relationship is given additionally to order, exchange and coincidence by the distinction of *similarity*.

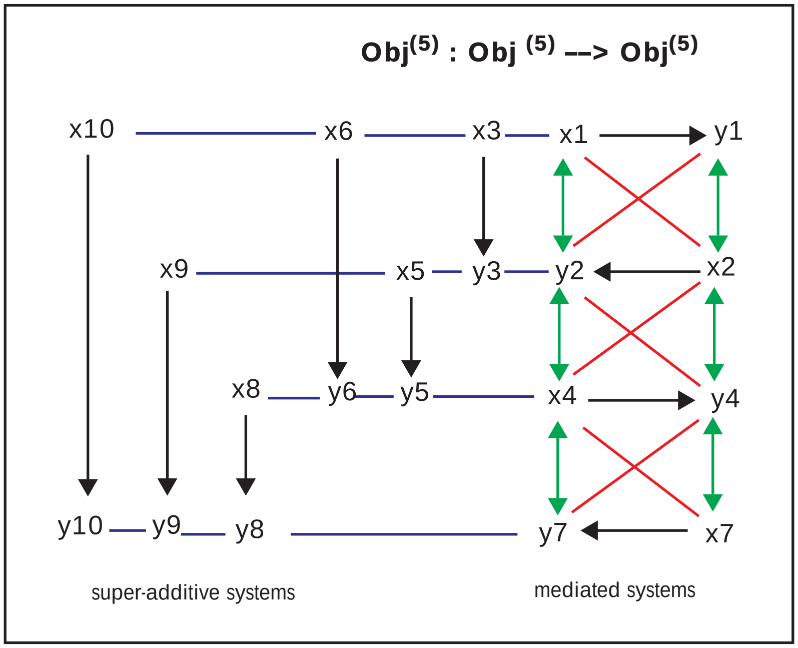


This diagram shows explicitly all possible relations of the chiasm.

coinc (x y)	***exch (x y)***	***siml (x y)***	***ord (x y)***	***opp (x y)***
x1 coinc x2	*x1 exch y2*	*x1 siml x3*	*x1 ord y1*	*x2 opp y3*
y1 coinc y2	*y1 exch x2*	*y2 siml y3*	*x2 ord y2*	*x3 opp y2*
y1 coinc y3	*x1 exch y3*		*x3 ord y3*	*x3 opp y1*
x2 coinc x3				

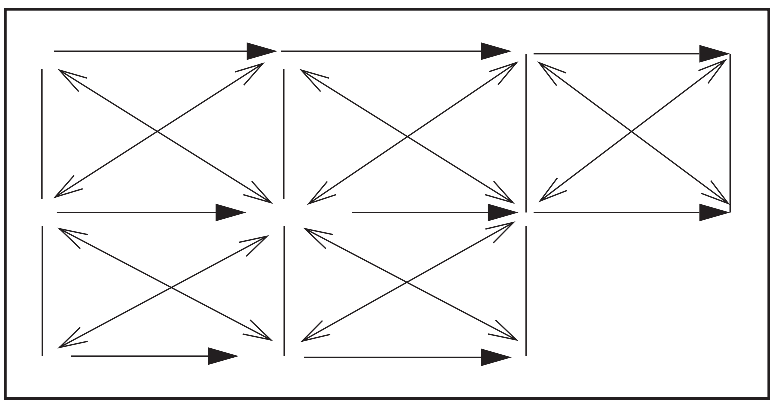
This is the table of a highly detailed description of the chiastic proemial relationship. In the following, I will omit this additional information about the distinction of similarity and coincidence.

Iterative composition of chiasms



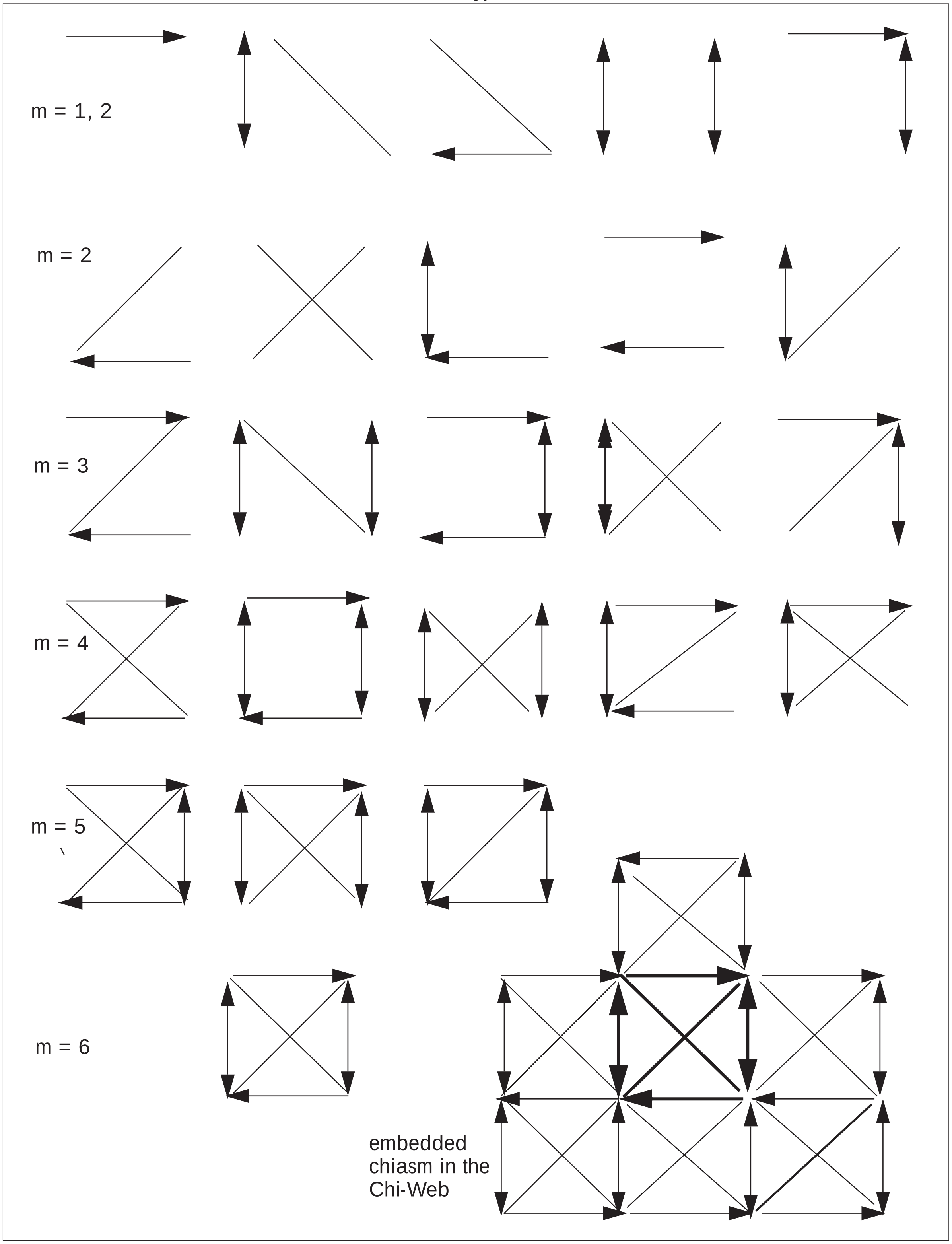
Not only morphisms can be composed but chiasms, too. This can happen in a mix of accretive and iterative compositions of diamonds.

Accretive and iterative compositions of chiasms



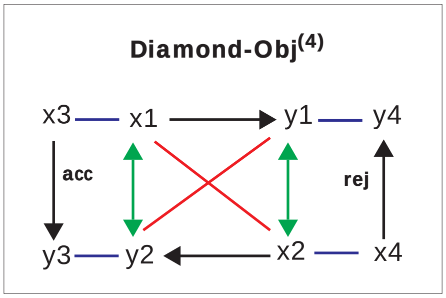
This diagram of iterative and accretive compositions of diamonds is omitting the super-additive systems of acceptionality and the rejectional sub-systems of rejectionality, too.

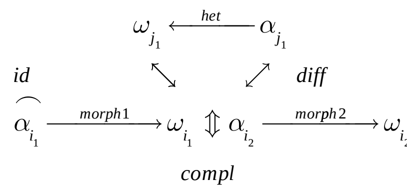
Table of different types of chiasms



5 Diamond of composition

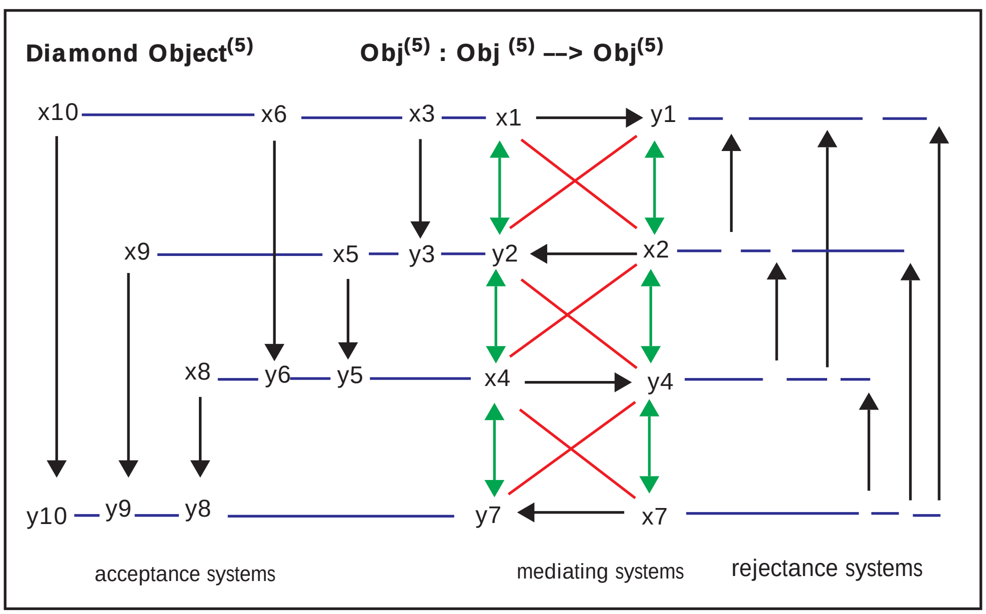
Finally, after 30 years of proemializing and chiastifying formal languages, the *diamond* of composition is introduced, which is accepting the *rejectional* aspect of chiastic compositions, too. It seems, that the diamond concept of composition is building a complete holistic unit. With its radical closeness it is opening up unlimited, linear and tabular, repeatability and deployment.





coinc (x y)	*exch (x y)*	*ord (x y)*	$\overline{\textit{ord}}$ *(x y)*
x1 coinc x2	*x1 exch y2*	*x1 ord y1*	*x4* $\overline{\textit{ord}}$ *y4*
y1 coinc y2	*y1 exch x2*	*x2 ord y2*	
x1 coinc x3		*x3 ord y3*	
y2 coinc y3			
y1 coinc y4			
x2 coinc x4			

Not only the coincidence relations are realized, and the inverse exchange relation, but also, additionally to the acceptional mediation relation, the rejectional mediation relation, defining all together the diamond structure of composition of morphisms.



To each composition there is a simultaneous complementary decomposition.

Hetero-morphisms are not concerned with morphisms but the composition rules of morphisms. The processuality of compositions, i.e., the activity to compose, is modeled in their hetero-morphisms.

Category theoretical interpretations of diamonds

$$
\begin{tikzcd}[column sep=small]
 & & (B^1,\omega_4) \leftarrow (A^2,\alpha_4) & & \\
(A^1,\alpha_1) \arrow[rr, "morph"] & & (B^1,\omega_1)\ o\ (A^2,\alpha_2) \arrow[u, dash, "\delta"'] \arrow[rr, "morph"] & & (B^2,\omega_2) \\
 & (A^1,\alpha_3) \arrow[ul, dash] \arrow[rr, "morph"] & & (B^2,\omega_3) \arrow[ur, dash, "\varphi"'] &
\end{tikzcd}
$$

Comments:

"o" is the composition operation between morphisms, *phi* is the coincidence relation, and *delta* the difference relation producing the complement of the composition "o".

Conditions for the diamond composition

$$
\begin{bmatrix}
o = \begin{cases} \lambda(\omega_1) \simeq \lambda(\alpha_2) \\ \lambda(A^2) \triangleq \lambda(B^1) \end{cases} \\
\varphi(A^1, \alpha_1) = \varphi(A^1, \alpha_3) \\
\varphi(B^2, \omega_2) = \varphi(B^2, \omega_3) \\
\delta\big((B^1, \omega_1)\ o\ (A^2, \alpha_2)\big) = \\
\big(\delta(B^1), \omega_4\big) \leftarrow \big(\delta(A^2), \alpha_4\big)
\end{bmatrix}
$$

Additional to the wording for the categorical composition, the wording of the rejectional part has to follow: the difference of the acceptional compositions of morphisms is producing the rejectional hetero-morphism. That is, the difference of (A2, α2) is coinciding with (A2, α4) and the difference of (B1, omega1) is coinciding with (B1, omega4). Hence, the complement of the acceptional composition is represented by a rejectional hetero-morphism.

The full wording is accessible with the associativity for morphisms and hetero-morphisms.

Composition of morphisms and hetero-morphisms in a diamond

The full wording is accessible with the associativity for morphisms and hetero-morphisms.

$$
\begin{bmatrix}
\begin{tikzcd}[column sep=tiny]
 & & & \omega_4 \xleftarrow{k||l} \alpha_4 & & & \\
 & & \omega_4 \leftarrow_l \alpha_4 \arrow[ur, dash] & & \omega_8 \leftarrow_k \alpha_8 \arrow[ul, dash] & & \\
\alpha_1 \arrow[rr, "f"] & & \omega_1\ o\ \alpha_2 \arrow[u, dash] \arrow[rr, "g"] & & \omega_2\ o\ \alpha_5 \arrow[u, dash] \arrow[rr, "h"] & & \omega_5 \\
 & \alpha_3 \xrightarrow{fg} \omega_3 \arrow[ul, dash] \arrow[ur, dash] & & & & \alpha_6 \xrightarrow{gh} \omega_6 \arrow[ul, dash] \arrow[ur, dash] & \\
 & & & \alpha_7 \xrightarrow{fgh} \omega_7 \arrow[ull, dash] \arrow[urr, dash] & & &
\end{tikzcd}
\end{bmatrix}
$$

The acceptance of f*g, acc(f,g), is the *composition* of f and g, (fg).

The rejectance of f*g, rej(f,g) is the *hetero-morphism* of f and g, (g^{o}, f^{o})=l.

The acceptance of f*g*h, acc(f,g,h), is the *composition* of f, g and h, (fgh).

The rejectance of f*g*h, rej(f,g,h) is the *jump* morphism of f^{a} and h^{o}, (h^{o}, f^{o})=k||l.

The acceptance f^{a} and h^{o}, acc(h^{o},f^{o}) is the *spagat* of f^{o} and h^{o}, ($f^{o}h^{o}$).

The acceptance f^{a}, g and h^{o}, acc(h^{o},g, f^{o}) is the *bridge* g of f^{o} and h^{o}, ($f^{o}gh^{o}$).

Thus, the operation *reject(gf)* of the acceptance morphisms f and g is producing the rejectance morphism k. And the operation *accept(k)* of the rejectance morphism k is producing the acceptance of the morphisms g and f.

5.1 In the Mix

Now, with the diamond of composition, we can perceive and observe time movements running simultaneously in opposite directions of each other. This antidromic feature of diamond-based composition is implemented in the laws and rules of diamonds, their categories and saltatories. Observing movements running forwards and backwards at once is enabling the activity to a recipient to switch between the different time directions; mixing them up to meander figures of time lines; mixing antidromic motives together.

Following the strategy *"From the Mind to the Blackboard!"* (B. Brecht), it is time-now to implement this observer-dependent switches into the play itself giving them an independent reality not depending on the decisions of an observer. *"In the Mix"* is proposing an implementation of such a real time-mix, based on the *bridging* rules of diamonds. The mix itself happens in two directions, one starting in the categories, the other starting in the saltatories, formalized by the concepts of *bridge* and *bridging*.

Operators involved in the Mix

composition (o) introduced by morphisms, matching condition, domain, codomain,

saltisition (| |) introduced by complementation (difference) of composition,

bridge (^) introduced by composition and difference from category and saltatory,

bridging (•) introduced by difference from bridge.

An example of a mix of morphisms and hetero-morphisms is is given by the diagram, representing the mix: (k • g • l) or (k | | l) o g.

$$\left[\begin{array}{l}
\qquad\qquad \omega_4 \xleftarrow{\qquad\qquad m \qquad\qquad} \alpha_4 \\
\qquad\qquad \omega_4 \xleftarrow[k]{} \alpha_4 \qquad\qquad \omega_8 \xleftarrow[l]{} \alpha_8 \\
\alpha_1 \xrightarrow{f} \omega_1 \Updownarrow \alpha_2 \xrightarrow{g} \omega_2 \Updownarrow \alpha_5 \xrightarrow{h} \omega_5 \\
\alpha_3 \xrightarrow{\qquad\qquad fg \qquad\qquad} \omega_3 \\
\qquad\qquad \alpha_6 \xrightarrow{\qquad\qquad gh \qquad\qquad} \omega_6 \\
\alpha_7 \xrightarrow{\qquad\qquad\qquad fgh \qquad\qquad\qquad} \omega_7
\end{array}\right]$$

As a consequence, the composition (f o g) and the saltisition (k | | l) are mixed to (l | | k) o g).

Bridging vs. jumping

The bridging / jumping difference shows clearely that not only *what* is achieved matters but *how* it is achieved, i.e., by *bridging* or by *jumping*.

Each *jump* in a saltatory has an inverse morphism as a bridge in a category.

Or, *rej(g)=m* and *acc(m)=g*.

Distributivity

$$(k \,||\, l) \bullet g = (g \bullet l) \,||\, (g \bullet k)$$
$$(k \,||\, l) \bullet g = (g \bullet l) \; o \; (g \bullet k)$$
$$(k \,||\, l) \bullet g = (g \bullet l) \bullet (g \bullet k)$$

The mix as a *distribution* of the operators involved into the antidromic mix of temporalities.

Bridge and Bridging Conditions BC

1. $\forall k, l, n \in HET, \forall f, g, h \in MORPH:$

a. composition

$g \circ f, g \circ h,$

$(h \circ g) \circ f, h \circ (g \circ f) \in MC,$

b. saltisition

$l \parallel k, n \parallel l,$

$n \parallel (l \parallel k), (n \parallel l) \parallel k \in \overline{MC},$

c. bridges

$g \perp k, l \perp g,$

$(l \perp g) \perp k, l \perp (g \perp k)$ are in $\widehat{BC}$.

d. bridging

$g \bullet k, l \bullet g,$

$(l \bullet g) \bullet k, l \bullet (g \bullet k)$ are in BC.

2. $(g \bullet k) \in BC$ iff $dom(k) = diff(dom(g)),$

$(l \bullet g) \in BC$ iff $cod(l) = diff(cod(g)),$

$(l \bullet g \bullet k) \in BC$ iff $(g \bullet k), (l \bullet g) \in BC.$

3. $(g \perp k) \in \widehat{BC}$ iff $diff(dom(k)) = dom(g),$

$(l \perp g) \in \widehat{BC}$ iff $diff(cod(l)) = cod(g),$

$(l \perp g \perp k) \in \widehat{BC}$ iff $(g \perp k), (l \perp g) \in \widehat{BC}.$

Bridging

Assoziativity :

If $k, g, l \in BC$, then $(k \bullet g) \bullet l = k \bullet (g \bullet l),$

Bridging :

$bridging_{(g, l, k)} : het(\omega_4, \alpha_4) \bullet hom(\alpha_2, \omega_2) \bullet het(\omega_8, \alpha_8) \rightarrow het(\omega_9, \alpha_9).$

Bridge

Assoziativity :

If $k, g, l \in \widehat{BC}$, then $(k \perp g) \perp l = k \perp (g \perp l),$

Bridge :

$bridge_{(g, l, k)} : het(\omega_4, \alpha_4) \perp hom(\alpha_2, \omega_2) \perp het(\omega_8, \alpha_8) \rightarrow het(\omega_9, \alpha_9).$

Bridges vs. Bridging vs. Jumping

$(l \perp g \perp k) \triangleq (l \bullet g \bullet k) \triangleq (l \parallel k),$

$(l \perp g \bullet k) \triangleq (l \bullet g \perp k) \triangleq (l \parallel k),$

$(l \bullet g \perp k) \triangleq (l \perp g \bullet k) \triangleq (l \parallel k).$

$diff(\perp) = (\bullet), (\perp) = diff(\bullet).$

5.2 Sketch of a formalization of diamonds

Cat - Gumm

$Objects : Co = \{A,\ B,\ \ldots\},\ Morphisms : Cm = \{f,\ g,\ \ldots\}$

$dom : Cm \longrightarrow Co,$

$cod : \ Cm \longrightarrow Co,$

$id : \quad Co \longrightarrow Cm$

$dom(g\ o\ f) = dom(f)\ and\ cod(g\ o\ f) = dom(g)$

$(h\ o\ g)\ o\ f = h\ o\ (g\ o\ f)$

$idA\ o\ f\ = f\ and\ g = g\ o\ idA$

Diamond

Cat +

$Hetero - Objects \qquad C_o^h = \{A^h, B^h, \ldots\},$

$Hetero - Morphisms \quad C_m^h = \{k,\ l,\ \ldots\},$

$Hetero - Differences \ D_m^h = \{i, j, \ldots\},$

$dom^h : \ C_m^h \longrightarrow C_o^h,$

$cod^h \ : \ C_m^h \longrightarrow C_o^h,$

$id^h \quad : \ C_o^h \longrightarrow C_m^h,$

$diff^h : \ C_o \longrightarrow C_o^h.$

$dom^h(k \parallel l) = dom^h(k)\ and\ cod^h(k \parallel l) = dom^h(k)$

$(m \parallel l) \parallel k = m\ o\ (l \parallel k)$

$idA^h\ o\ l\ = l\ and\ m = m\ o\ idA^h$

$diff(cod(g\ o\ f)) = cod^h(l)$

$diff(dom(g\ o\ f)) = dom^h(l)$

$diff(g\ o\ f) = l$

$i : (cod(g\ o\ f)) \longrightarrow cod^h(l)$

$j : (dom(g\ o\ f)) \longrightarrow dom^h(l)$

$(g\ o\ f)\ o\ i\ and\ (g\ o\ f)\ o\ j\ = l$

$(g\ o\ f)\ o\ (j \parallel i) = l$

$reject(gf) = k$

$reject(hg) = l$

$reject(hgf) = m$

$accept\ = reject^{-1}$

$$\begin{array}{lcccr}
 & & \omega_{j_1} \xleftarrow{het\ \ l} \alpha_{j_1} & & \\
id & & \nwarrow\!\!\searrow i \qquad j \swarrow\!\!\nearrow diff & & \\
\overset{\frown}{\alpha_{i_1}} & \xrightarrow{morph\ \ f} & \omega_{i_1}\ \ o\ \ \alpha_{i_2} & \xrightarrow{morph\ \ g} & \omega_{i_2} \\
| & & comp & coincidence & | \\
\alpha_{i_3} & & \xrightarrow{\qquad\qquad morrph\ \ fg \qquad\qquad} & & \omega_{i_3}
\end{array}$$

$$\mathbf{Diamond}^{(m)}_{\mathbf{Category}} = \left(\mathbf{Cat}^{(m)}_{\mathbf{coinc}} \mid \mathbf{Cat}^{(m-1)}_{\mathbf{jump}}\right)$$

$$\mathbb{C} = (M, o, \|)$$

1. Matching Conditions

$a.\ g\ o\ f,\ h\ o\ g,\ k\ o\ g\ and$

$$b_1 \xleftarrow{l} b_2$$
$$c_1 \xleftarrow{m} c_2$$
$$d_1 \xleftarrow{n} d_2$$
$$l \parallel m \parallel n \ \text{are defined},$$

$b.\ h\ o\ ((g\ o\ f) o\ k)\ and$

$$b_1 \xleftarrow{l} b_2 \parallel c_1 \xleftarrow{m} c_2 \parallel d_1 \xleftarrow{n} d_2$$
$$l \parallel (m \parallel n) \ \text{are defined}$$

$c.\ ((h\ o\ g)\ o\ f) o\ k\ and$

$$(l \parallel m) \parallel n \ \text{are defined},$$

$d.\ mixed: f, l, m$

$$l \parallel m, \bar{l}\ o\ f\ o\ \overline{m}$$
$$(\bar{l}\ o\ f)\ o\ \overline{m},$$
$$\bar{l}\ o\ (f\ o\ \overline{m}) \ \text{are defined}.$$

2. Associativity Condition

$a.\ If\ f, g, h \in MC,\ then\ h\ o\ ((g\ o\ f)\ o\ k) = ((h\ o\ g)\ o\ f)\ o\ k\ and$

$l, m, n \in MC \qquad l \parallel (m \parallel n) = (l \parallel m) \parallel n$

$b.\ If\ \bar{l}, f, \overline{m} \in MC,\ then\ (\bar{l}\ o\ f)\ o\ \overline{m} = \bar{l}\ o\ (f\ o\ \overline{m})$

3. **Unit Existence Condition**

$$a.\ \forall f\ \exists(u_C, u_D) \in (M, o, \|): \begin{cases} u_C\ o\ f, u_D\ o\ f, \\ u_C \parallel f, u_D \parallel f \end{cases} \text{are defined}.$$

4. Smallness Condition

$$\forall(u_1, u_2) \in (M, o, \|): hom(u_1, u_2) \wedge het(u_1, u_2) =$$
$$\left\{ \begin{array}{l} f \in M \mid f\ o\ u_1 \wedge u_2\ o\ f, \\ f \in M \mid f \parallel u_1 \wedge u_2 \parallel f \ \text{are defined} \end{array} \right\} \in SET$$

Diamond rules for morphisms

$$\frac{f \in Morph,\ g \in Morph}{gf \in Morph}$$

$$\frac{g \in Morph,\ h \in Morph}{hg \in Morph}$$

$$\frac{fg \in Morph,\ gh \in Morph}{ghf \in Morph}$$

$$\frac{fg \in Morph}{k \in \overline{Morph}} \qquad \frac{gh \in Morph}{l \in \overline{Morph}}$$

$$\frac{fg \in Morph,\ gh \in Morph}{m \in \overline{Morph}}$$

$$\frac{k \in \overline{Morph},\ l \in \overline{Morph}}{m \in \overline{Morph},\ m = k \,||\, l}$$

$$\frac{k \in \overline{Morph},\ g \in Morph,\ l \in \overline{Morph}}{kgl \in \overline{Morph}}$$

$$\frac{k \in \overline{Morph}}{fg \in Morph} \quad \frac{l \in \overline{Morph}}{gh \in Morph}$$

– Matching conditions for morphisms f, g, h are realized in the usual way, i.e., codomain of f is coinciding with domain of g, thus guarantying the composition (f o g).

The same happens for the composites (fg) and (gh) guaranteeing the composition (fgh).

– Complementary, the categorial difference between hetero-morphism k and l have to "co-incide" to guarantee the jump-composition (kl).

– The spagat-composition (kgl) is realized as a mix of category and jumpoid compositions.

Diamond= [Morph, $\overline{\text{Morph}}$, o, ||]

o = composition-operator
||= jump-operator
Morph = morphisms
$\overline{\text{Morph}}$ = hetero-morphisms

Different aspects of the same

Diagram	Chiasm	Diamond

$$\left[\begin{array}{lcl} & \omega_4 \xleftarrow{l} \alpha_4 & \\ \alpha_1 \xrightarrow{f} \omega_1 & \Updownarrow & \alpha_2 \xrightarrow{g} \omega_2 \\ \alpha_3 \xrightarrow{\quad fg \quad} & & \omega_3 \end{array}\right] \equiv \left[\begin{array}{ccccc} \alpha_3 - & \alpha_1 & \xrightarrow{f} & \omega_1 & - \omega_4 \\ \downarrow & \Updownarrow & \times & \Updownarrow & \uparrow \\ \omega_3 - & \omega_2 & \xleftarrow{g} & \alpha_2 & - \alpha_4 \end{array}\right] \equiv \left[\begin{array}{c} \omega_4 \xleftarrow{l} \alpha_4 \\ \alpha_1 \xrightarrow{f} \omega_1 \ o\ \alpha_2 \xrightarrow{g} \omega_2 \\ \alpha_3 \xrightarrow{fg} \omega_3 \end{array}\right]$$

6 Compositions of Diamonds

Diamonds can be composed in an iterative and an accretive way, both together composing a tabular pattern of diamonds. This approach is focused on the composition of diamonds as such and not on the composition of morphisms in diamonds.

Accretive and mixed iterative+accretive iterability

$$\left[\begin{array}{ll}
\alpha_3 - \alpha_1 \xrightarrow{f} \omega_1 - \omega_4 \; - & \alpha_3' - \alpha_1' \xrightarrow{f} \omega_1' - \omega_4' \\
\downarrow \quad \Updownarrow \quad \times \quad \Updownarrow \quad \uparrow & \downarrow \quad \Updownarrow \quad \times \quad \Updownarrow \quad \uparrow \\
\omega_3 - \omega_2 \xleftarrow{g} \alpha_2 - \alpha_4 \; - & \omega_3' - \omega_2' \xleftarrow{g} \alpha_2' - \alpha_4' \\
\downarrow \quad \Updownarrow \quad \times \quad \Updownarrow \quad \uparrow & \\
\alpha_3 - \alpha_1 \xrightarrow{f} \omega_1 - \omega_4 & \\
\downarrow \quad \Updownarrow \quad \times \quad \Updownarrow \quad \uparrow & \\
\omega_3 - \omega_2 \xleftarrow{g} \alpha_2 - \alpha_4 & \\
\downarrow \quad \Updownarrow \quad \times \quad \Updownarrow \quad \uparrow & \\
\alpha_3 - \alpha_1 \xrightarrow{f} \omega_1 - \omega_4 & \\
\downarrow \quad \Updownarrow \quad \times \quad \Updownarrow \quad \uparrow & \\
\omega_3 - \omega_2 \xleftarrow{g} \alpha_2 - \alpha_4 &
\end{array}\right]$$

Notational abbreviation

The notation of the chiastic composition structure can be omitted by the *block* representation of the composition of the basic chiasms. Hence, the bracket are symbolizing chiastic composition at all of their 4 sides, left/right and top /bottom.

That is, the top and bottom aspects are representing chiastic compositions in the sense of accretion of complexity. The right/left-aspects are connections in the sense of iterative complication. Iteration per se is not chiastic but compositional in the usual sense.

Iterative composition is coincidental, accretive composition is chiastic. Coincidental composition is based on the coincidence of domains and codomains of morphisms, chiastic composition is based on the exchange relation between alpha and omega properties of morphisms. Both together, are defining the free composition of diamonds.

In a diamond grid, all kind of different paths, not accessible in category theory, are naturally constructed.

Free iterative and accretive chiasm-block compositions

$$\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}$$

$$\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}$$

$$\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}$$

$$\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\qquad\qquad\qquad\qquad\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}$$

$$\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}$$

$$\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}$$

$$\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\qquad\qquad\qquad\qquad\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}$$

$$\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}$$

$$\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}$$

$$\begin{bmatrix} \alpha_3'-\alpha_1'\xrightarrow{f}\omega_1'-\omega_4' \\ \downarrow\quad\Updownarrow\quad\times\quad\Updownarrow\quad\uparrow \\ \omega_3'-\omega_2'\xleftarrow{g}\alpha_2'-\alpha_4' \end{bmatrix}$$

7 Diamondization of diamonds

Like the possibility of categorization of categories there is a similar strategy for diamonds: *the diamondization of diamonds*. As a self-application of the diamond questions, the diamond of the diamond can be questioned. Diamond are introduced as the quintuple of proposition, opposition, acceptionality, rejectionality and positionality,

```
D=[prop, opp, acc, rej; pos].
```

The complementarity of *acceptional* and *rejectional* properties of a diamond can themselves be part of a new diamondization.

What is both together, acceptional and rejectional systems? As an answer, *mediating* systems can be considered as belonging at once to acceptional as well to rejectional systems.

What is neither acceptional nor rejectional? An answer may be the *positionality* of the diamond. Positionality of a diamond is neither acceptional nor rejectional but still belongs to the definition of a diamond.

Hence, diamond of diamonds or second-order diamonds:

```
DD=[Acc, Rej, Med, Pos].
```

Thus,

[Acc, Rej]-*opposition* can be studied on a second-level as a complementarity per se,

[Acc, Rej]-*both-and* can be studied as the mediating systems per se (Core),

[Acc, Rej]-*neither-nor* can be studied as the mechanisms of positioning (Pos), esp. by the *place-designator*.

What are the specific formal laws of the diamond of diamonds?

Between the first-order opposition of acceptional and rejectional systems of diamonds there is a complementarity, which can be studied as such on a second-level of diamondization. What are the specific features of this complementarity? Like category theory has its *duality* as a meta-theorem, second-order diamond theory has its *complementarity* theorem.

Hence, it is reasonable to study mediating systems per se, without their involvement into the complementarity of acceptional and rejectional systems. What could it be? Composition without commutativity and associativity? The axioms of identity and associativity are specific for categories. But, on a second-order level, they may be changed, weakened or augmented in their strength.

The study of the positionality per se of diamonds might be covered by the study of the functioning of the place-designator as an answer to the question of the positionality of the position of a diamond. Without doubt, positionality and its operators, like the "place-designator" and others, in connection to the kenomic grid, can be studied as a topic per se.

The first-order positionality of diamonds has become itself a topic of second-order diamonds, the neither-nor of acceptance and rejectance. Hence, because also second-order diamonds are positioned, a new kind of localization enters the game: the localization of second-order diamonds into the tectonics of kenomic systems, with their proto-, deutero- and trito-kenomic levels.

All together is defining a second-order diamond theory.

8 Composing the answers of *"How to compose?"*

This is a systematic summary of the paper "How to Compose?" It may be used as an introduction into the topics of a general theory of composition.

8.1 Categorical composition

Category theory is defining the rules of composition. It answers the question: How does composition work? What to do to compose morphisms?

Answer: Category Theory. It is focused on the surface-structures of the process of composing morphism, realized by the triple DPS of Data (source, target), Structure (composition, identity) and Properties (unity, associativity) by fulfilling the matching conditions for morphisms.

The properties (axioms) of categories are the global conditions for the final realization of the local rules of composition, i.e., the matching conditions for morphisms to be composed.

1.1.1 Categories I: graphs with structure

Definition 1 *A* category *is given by*

i) DATA*: a diagram* $C_1 \overset{s}{\underset{t}{\rightrightarrows}} C_0$ *in* Set

ii) STRUCTURE*: composition and identities*

iii) PROPERTIES*: unit and associativity axioms.*

The data $C_1 \overset{s}{\underset{t}{\rightrightarrows}} C_0$ is also known by the (over-used) term "". We can interpret it as a set C_1 of arrows with source and target in C_0 given by s, t.

Categories are based on their global Properties of "unit" and "associativity", understood as the axioms of categorical composition of morphisms.

8.2 Proemial composition

Proemiality answers the question: What enables categorical composition? What is the deep-structure of categorical composition?

Answer: proemial relationship.

Proemial relationship is understood as a cascade of order- and exchange-relations, as such it is conceived as a pre-face (pro-oimion) of any composition.

Parts of the categorial Structure are moved into the proemial Data domain. Or inverse: Parts of the Data (source, target) are moved into the Structure as exchange relation.

Thus,

Data (order relation=morphism),

Structure (exchange relation, position; identity, composition).

Properties (diversity; unit, associativity)

That is, categorical Structure is distributed over different levels of the proemial relationship.

Proemiality is based on order- and exchange relations. That is, order relations are based on a cascade of exchange relations and exchange relations are founded in cascade of order relations.

But this interlocking mechanism is not inscribed into the definition of proemiality, it occurs as an interpretation, only. Hence, proemiality as a pre-face may face the essentials of composition but not its true picture.

8.3 Chiastic composition

Chiastic approach to proemial composition answers the question: How is proemiality working? What enables proemiality to work?

Answer: Chiasm of the proemial constituents, i.e., order- and exchange relation.

The chiasm of composition is the inscription of the reading of the proemial relationship. It is mediating the upwards and downwards reading of proemiality, which in the proemial approach is separated. Proemiality is still depending on logo-centric thematizations even if its result are surpassing it by it polycontexturality.

Hence, it is realizing the Janus-faced movements of double exchange relations.

To avoid empty phantasms and eternal dizziness of the Janus-faced double movements of exchange relations, iterative and accretive, up- and downwards, the coincidence relations of chiasms have to enter the stage.

That is, the matching conditions have to be applied to the exchange relations as well as to the coincidence relations to perform properly the game of chiasms on trusted arenas.

Thus, proemiality, with its single exchange relation and lack of coincidence, is still depending on logo-centric thematizations, mental mappings, even if its result are surpassing radically its limits by the introduction of polycontexturality.

Hence, proemiality is depending on a specific reading, i.e., a mental mapping of chiasms. This proemial reading has to imagine the double movements of the way up and the way down. And the coherence of the different levels, formalized in chiasms by the coincidence relations.

The DSP-transfer is:

Data (morphisms),

Structure (exchange, coincidence, position; identity, composition),

Properties (diversity; unity, associativity)

8.4 Diamond of composition

The diamond approach answers the question: What is the deep-structure of composition per se, i.e., independent from the definition or view-point of morphisms and its chiasms?

Answer: the interplay of acceptional and rejectional process / structures as complementary movements of diamonds. Without such an interplay there is no chiasm, and hence, no proemiality nor categorial composition.

The DSP-transfer is:

Data (morphisms, hetero-morphism),

Structure (double-exchange, coincidence, position; identity, difference, composition, de-composition),

Properties (unity, diversity, associativity, complementarity).

In fact, diamonds don't have Data and Structure, everything is in the Properties as an interplay of global and local parts. Hence, diamonds are playing the Properties (global / local, surface / deep-structure).

Hence, diamonds are playing the

Properties (global / local, surface / deep-structure),

which is realized by the interplay of categories and saltatories, hence, again,

.A descriptive definition of diamonds

$$\begin{pmatrix} coinc(\alpha_1, \alpha_3), \\ coinc(\omega_2, \omega_3) \end{pmatrix},$$

then

$$morph(\alpha_1, \omega_1) \; o \; morph(\alpha_2, \omega_2) = morph(\alpha_3, \omega_3),$$

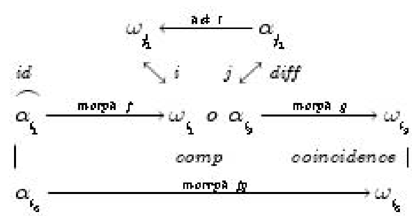
and if

$$\begin{pmatrix} diff(\alpha_2) = \alpha_4, \\ diff(\omega_1) = \omega_4 \end{pmatrix},$$

then

$$compl(morph(\alpha_3, \omega_3)) = het(\alpha_4, \omega_4)$$

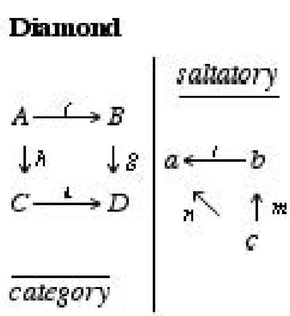
$$Diamond(morph) = \chi \langle accept, reject \rangle$$
$$accept\ (morph_1, morph_2) = morph_3$$
$$reject\ (morph_1, morph_2) = morph_4$$



Terms

morph / het
coinc / diff
id / div
o / ‖
dual / compl
accept / reject

Properties (categories, saltatories



Saltatories are founded in categories and categories are founded in saltatories; both together in their interplay are realizing the diamond structure of composition.

8.5 Interplay of the 4 approaches

How are the 4 approaches related? What's their interplay? What is the deep-structure of "interplay"?

Answer: Diamonds as the interplay of interplays, i.e., the play of global / local and surface- / deep-structures are realizing the autonomous process / structure "diamond".

8.6 Kenogrammatics of Diamonds

Diamonds are taking place, they are positioned, hence their positionality is their deep-structure. The positionality of diamonds, marked by their place-designator, is the kenomic grid with its tectonics of proto-, deutero- and trito-structure of kenogrammatics.

Because diamonds are placed and situated they can be repeated in an iterative and a accretive way. Iteration is application inside the framework of a diamond system, hence iteration remains mono-contextural. Polycontexturality of diamonds is an accretive repetition, i.e., a dissemination of frameworks of diamonds.

Kenogrammatics answers the question: How to get rid of diamonds (without loosing them)?

In other words, kenogrammatics is inscribing diamonds without the necessity to relate them to the drama of composition.

Hence, the kenogrammatics of diamonds is opening up a *composition-free calculus of "composition"*.

8.7 Polycontexturality of Diamonds

Because of the iterability of diamonds based in the fact that diamonds are placed and situated in a kenomic grid they can be repeated in an iterative and a accretive way.

Iteration is application inside the framework of a diamond system, hence iteration remains mono-contextural.

Polycontexturality of diamonds is an accretive repetition, i.e., a dissemination of frameworks of diamonds.

9 Applications

9.1 Foundational Questions

The 2-level definition of the diamond composition as a composition and a complement, opens up the possibility to control the fulfilment of the conditions of coincidence of the categorial composition from the point of view of the complementary level.

If the morphism *l* is verified, then the composition *(f o g)* is realized. The verification is checking at the level *l* if the coincidence of cod(f) and dom(g), i.e., *cod(f)=dom(g)*, for the composition "o", is realized.

Thus, simultaneously with the realization of the composition, the complementary morphism *l* is controlling the (logical, categorical) adequacy of the composition (fg).

Diamonds are involved with bi-objects. Objects of the category and counter-objects of the *jumpoid* (saltatory) of the diamond. Both are belonging to different contextures, thus being involved with 2 different logical systems. The interplay between categories and jumpoids (saltatories) is ruled by a third, mediating logic for both, representing the mediating systems of the diamond. Saltatories are founded in categories and categories are founded in saltatories; both together in their interplay are realizing the diamond structure of composition.

9.2 Diamond class structure

$$\overbrace{\text{OthersClass}}$$

$$\underbrace{\overbrace{\text{MyClass – YourClass}}}$$

$$\underbrace{\text{OurClass}}$$

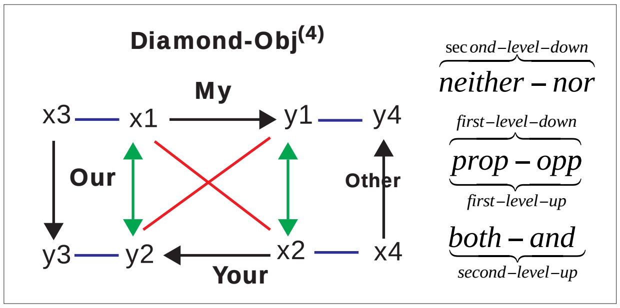
The harmonic My-Your-Our-Class conceptualization has to be augmented by a class which is incorporating the place for the other, the unknown, the difference to the harmonic system. That is, the NotOurClass is thematized positively as such as the class for others, called the *OthersClass*. Hence, the OthersClass can serve as the place where intruders, attacks, disturbance, etc. can be observed and defended. But also, it is the place where the new, inspiration, surprise and challenge can be localized and welcomed.

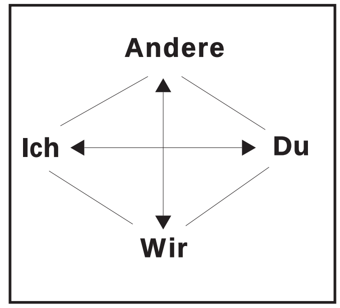
Again, this is a logical or conceptual place, depending in its structure entirely from the constellation in which it is placed as a whole. The OthersClass is representing the otherness to its own system. It is the otherness in respect of the structure of the system to which it is different. This difference is not abstract but related to the constellation in which it occurs. It has, thus, nothing to do with information processing, sending unfriendly or too friendly messages. Before any de-coding of a message can happen the logical correctness of the message in respect to the addressed system has to be realized.

In more metaphoric terms, it is the place where security actions are placed. While the OurClass place is responsible for the togetherness of the MyClass/YourClass interactions, i.e., mediation, the OthersClass is responsible for its segregation. Both, OurClass and OthersClass are second-order conceptualizations, hence, observing the complex mediating system "MyClass–YourClass". Internally, OurClass is focussed on what MyClass and YourClass have in common, OthersClass is focusing on the difference of both and its correct realization. In contrast to mediation it could be called *segregation*.

In other words, each polycontextural system has not only its internal complexity but also an instance which is representing its external environment according to its own complexity. In this sense, the system *has* its own environment and is not simply inside or embedded into an environment.

9.3 Communicational application





Coming to terms?

Often, love between two people is perceived as a My/Your-relationship realizing together a kind of a Our-domain. The other part of the diamond, the Others, is mostly excluded or at least reduced to known constellations. From a diamond approach to an understanding of love, all 4 positions have to be involved into the diamond game.

According to the chiasm between acceptional and rejectional domains, there is no fixed order, which couldn't be changed into its complementary opposite. What can be anticipated has a model in an acceptional domain and has lost, therefore, its unpredictable otherness. The otherness is what cannot be predicted. What we can know is that we always have to count with it as the surprise of unpredictable events.

Communicationally accessible are the Your/My-parts and the common Our-part of the scheme. These communicational relationships, i.e., interactions, can be made as transparent as possible. An application of the Diamond Strategies may be guiding to augment transparency, which is supported by the reflectional properties of the diamond. Further questioning of what could be the Others-part would clear some expectations. But everything which can be anticipated is losing its unpredictability. After new experiences happened, it can be asked about the unpredictable aspects, which happened despite the anticipative explorations.

These unpredictable experiences can be considered as belonging to the rejectional part of the system, only if its matching conditions, defined by the difference-relations, are realized. That is, if something totally different to the system happens, say an earthquake, then this experience is not a rejectional part of the communicational system of You-and-Me in question, but at least at first, something else.

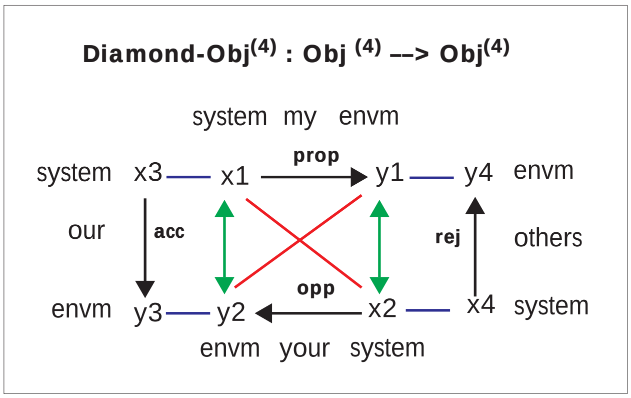
After the unpredictible happened, it can be domesticated, which means, it can be modelled in a new acceptional part of the system. Hence the complexity of the system as a whole is augmented by the domestication of the new experience. It also has to be questioned what made the experience such different that it couldn't be appreciated. Hence, the rejectional part of the diamond can be questioned in advance and in retrospect by a new aspect of the general *diamond format* to be constructed.

By this example of a communicational application the rejectional part can be consciously experienced and described only after it happened. Nevertheless, structurally, i.e., independent of its content, its possibility was part of the diamond from the very beginning. All 3 aspects of the systems are playing together: 1.The *mediating* system, realizing the pure chiasms, 2. *acceptional* systems as the super-additive components based on the chiasms, and 3. the *rejectional* systems as the complementary system to the acceptional systems, realizing the inscription of the operativity of the composition of the morphisms, i.e., the interactivity between proposition (Me) and opposition (You).

9.4 Diamond of system/environment structure

Some wordings to the diamond system/environment relationship.

What's my environment is your system,
What's your environment is my system,
What's both at once, my-system and your-system, is our-system,
What's both at once, my-environment and your-environment, is our-environment,
What are our environments and our systems is the environment of our-system.
What's our-system is the environment of others-system.
What's neither my-system nor your-system is others-system.
What's neither my-environment nor your-environment is others-environment.



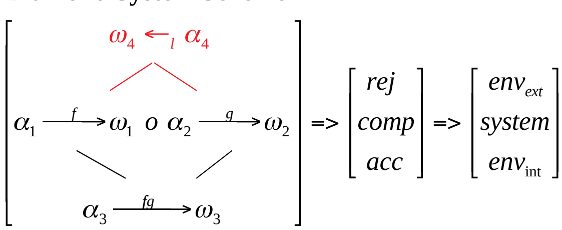
The diamond modeling of the otherness of the others is incorporating the otherness into its own system. An external modeling of the others would have to put them into a different additional contexture. With that, the otherness would be secondary to the system/environment complexion under consideration. The diamond modeling is accepting the otherness of others as a "first class object", and as belonging genuinely to the complexion as such.

Again, it seems, that the diamond modeling is a more radical departure from the usual modal logic and second-order cybernetic conceptualizations of interaction and reflection. The diamond is reflecting onto the same (our) and the different (others) of the reflectional system.

Internal vs. external environment

In another setting, without the "antropomorphic" metaphors, we are distinguishing between the system, its internal and its external environment. The external environment corresponds the rejectional part, the internal to the acceptional part of the diamond. Applied to the diamond scheme of diamondized morphisms we are getting directly the *diamond system scheme* out of the diamond-object model.

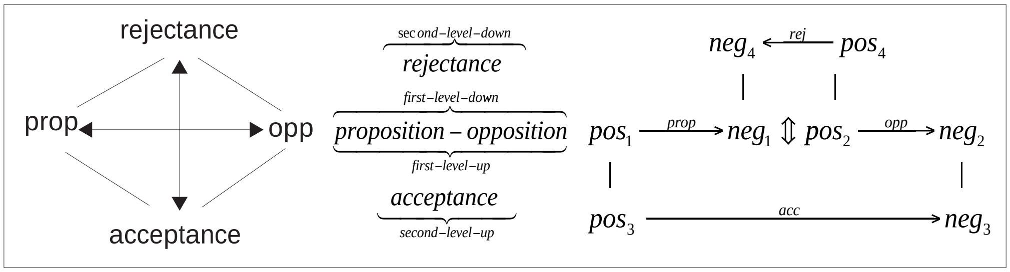
Diamond System Scheme



Thus, a diamond system is defined from its very beginning as being constituted by an internal and an external environment.

Further interpretations could involve the reflectional/interactional terminology of logics. The acceptional part fits together with the *interactional* and the rejectional part with the *reflectional* function of a system. Obviously, a composition is an interaction between the composed morphisms. The interactionality of the composition is represented by the acceptional system, the rejectionality is representing its reflectionality.

9.5 Logification of diamonds



General Logification Strategy

A logification of the diamond strategies, which is importing the architectonics of the diamond into the architectonics of polycontextural logical systems, has to consider 3 different types of logical systems:

The chiastic chain of mediating logics, i.e., the *mediating* logics.
The chains of mediating logics, i.e., the logics of *acceptance*.
The chains of separating logics, i.e., the logics of *rejectance*.

The chain of mediating logics corresponds to the chain of proposition and opposition systems.The basic chiastic structure or the proemiality of the mediating logics is mirrored by the mediating and the separating logics, representing the acceptance and the rejectance functions of logics in diamonds.

Logification of diamonds corresponds to the techniques used in polylogics.

Logification scheme for 4-diamonds

$$\begin{bmatrix}
 & neg_9 & \longleftarrow & & pos_9 & \\
 & | & & & | & \\
 & neg_4 \leftarrow pos_4 & & neg_7 \leftarrow pos_7 & & \\
 & | \quad\quad | & & | \quad\quad | & & \\
pos_1 \longrightarrow & neg_1 \Updownarrow pos_2 & \longrightarrow & neg_2 \Updownarrow pos_5 & \longrightarrow & neg_5 \\
| & \quad\quad | & & | & & | \\
pos_3 & \longrightarrow & \longrightarrow & neg_3 & & | \\
| & \quad\quad | & & & & | \\
| & \quad\quad pos_6 & \longrightarrow & & \longrightarrow & neg_6 \\
| & & & & & | \\
pos_8 & \longrightarrow & \longrightarrow & & \longrightarrow & neg_8
\end{bmatrix}
\begin{bmatrix}
S_9 \\
S_4 S_7 \\
S_1 \mid S_2 \mid S_5 \\
S_3\, S_6 \\
S_8
\end{bmatrix}$$

Negations in a elementary 3-diamond

$$\begin{bmatrix} id_4 \\ \\ id_1 id_2 \\ \\ id_3 \end{bmatrix} : \begin{bmatrix} & & neg_4 \leftarrow pos_4 & & \\ & & | \qquad\quad | & & \\ pos_1 & \longrightarrow & neg_1 \Updownarrow pos_2 & \longrightarrow & neg_2 \\ | & & & & | \\ pos_3 & & \xrightarrow{\hspace{6em}} & & neg_3 \end{bmatrix}$$

$$\begin{bmatrix} id_4 \\ non_1 id_2 \\ id_3 \end{bmatrix} : \xrightarrow{neg1} \begin{bmatrix} neg_4 - neg_1 & \longleftarrow & pos_1 \mid pos_3 & \longrightarrow & neg_3 \\ \uparrow \qquad \Updownarrow & & & & | \\ pos_4 - pos_2 & & \xrightarrow{\hspace{6em}} & & neg_2 \end{bmatrix}$$

$$\begin{bmatrix} id_4 \\ id_1 non_2 \\ id_3 \end{bmatrix} : \xrightarrow{neg2} \begin{bmatrix} pos_3 & \longrightarrow & neg_3 \mid neg_2 & \longleftarrow & pos_2 - pos_4 \\ | & & & & \Updownarrow \qquad \downarrow \\ pos_1 & & \xrightarrow{\hspace{6em}} & & neg_1 - neg_4 \end{bmatrix}$$

$$\begin{bmatrix} id_4 \\ \\ id_1 id_2 \\ \\ non_3 \end{bmatrix} : \xrightarrow{neg4} \begin{bmatrix} & & pos_4 \rightarrow neg_4 & & \\ & & | \qquad\quad | & & \\ neg_2 & \longleftarrow & pos_2 \Updownarrow neg_1 & \longleftarrow & pos_1 \\ | & & & & | \\ neg_3 & & \xleftarrow{\hspace{6em}} & & pos_3 \end{bmatrix}$$

$$\begin{bmatrix} non_4 \\ \\ id_1 id_2 \\ \\ id_3 \end{bmatrix} : \xrightarrow{neg4} \begin{bmatrix} & & pos_4 \rightarrow neg_4 & & \\ & & | \qquad\quad | & & \\ neg_2 & \longleftarrow & pos_2 \Updownarrow neg_1 & \longleftarrow & pos_1 \\ | & & & & | \\ neg_3 & & \xleftarrow{\hspace{6em}} & & pos_3 \end{bmatrix}$$

Formal rules of negation for a 3-diamond

$$\begin{bmatrix} id_4 \\ non_1 id_2 \\ id_3 \end{bmatrix} : \begin{bmatrix} S_4 \\ S_1 \mid S_{2.} \\ S_3 \end{bmatrix} \xrightarrow{neg1} \begin{bmatrix} \overline{S_4} \\ \overline{S}_1 \mid S_{3.} \\ S_2 \end{bmatrix}$$

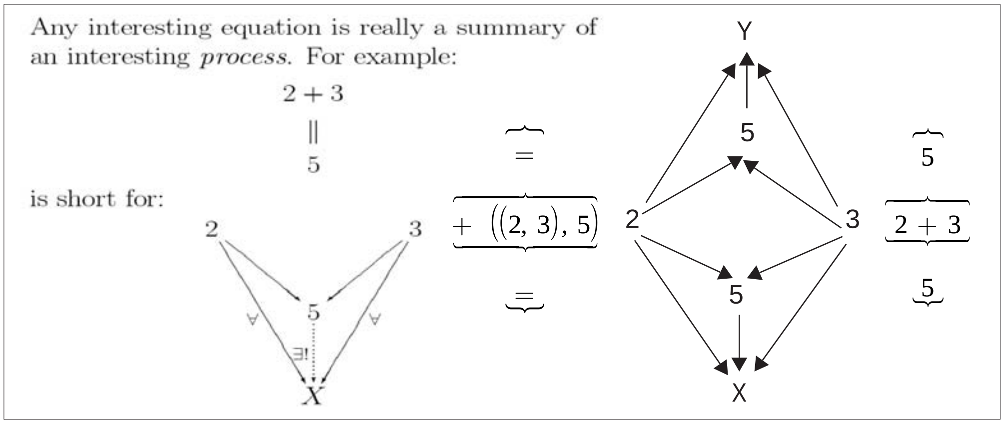
$$\begin{bmatrix} id_4 \\ id_1 non_2 \\ id_3 \end{bmatrix} : \begin{bmatrix} S_4 \\ S_1 \mid S_{2.} \\ S_3 \end{bmatrix} \xrightarrow{neg2} \begin{bmatrix} S_4 \\ S_3 \mid \overline{S_{2.}} \\ S_1 \end{bmatrix}$$

$$\begin{bmatrix} id_4 \\ id_1 id_2 \\ non_3 \end{bmatrix} : \begin{bmatrix} S_4 \\ S_1 \mid S_{2.} \\ S_3 \end{bmatrix} \xrightarrow{neg3} \begin{bmatrix} \overline{S_4} \\ \overline{S}_2 \mid \overline{S_{1.}} \\ \overline{S}_3 \end{bmatrix}$$

$$\begin{bmatrix} non_4 \\ id_1 id_2 \\ id_3 \end{bmatrix} : \begin{bmatrix} S_4 \\ S_1 \mid S_{2.} \\ S_3 \end{bmatrix} \xrightarrow{neg4} \begin{bmatrix} \overline{S_4} \\ \overline{S_2} \mid \overline{S}_1 \\ \overline{S_3} \end{bmatrix}$$

9.6 Arithmetification of diamonds

An arithmetification of diamonds is surely at once a diamondization of arithmetic.



How is the diamond operation, 2+2=5, to read? The first diagram gives an explanation of the processes involved into the addition. That is, for all numbers 2 of X and all numbers 3 of X there is exactly one number 5 of X representing the addition 2+3. This is the classic operational or categorial approach to addition (Baez).

The second diagram shows the diamond representation of the addition 2+3. The wordings are the same, one for X, and one for Y. The equation is *stable* in respect of the acceptional addition and the rejectional addition iff X=Y. That is, iff the numbers and the operations belong to isomorphic arithmetical systems, then they are equivalent. If X would be a totally different arithmetical system to Y then some disturbance of the harmony between both would happen. Nevertheless, because of their rejectional direction, numbers of Y might "run" in reverse order to X and coincide at the point of X=Y.

The meaning of a sign is defined by its use. Thus, the numeral "5" belonging to the system X, has not exactly the same meaning as the numeral "5" belonging to the system Y. They may be isomorphic, hetero-morphic, equivalent, but they are not equal. Equality is given intra-contextually for terms of X only, or for terms of Y only. But not for terms between X and Y. In other words, the equation is realized as an equivalence only if it has a model in the rejectional, i.e., in the environmental or context system. Otherwise, that is, without the environmental system, the arithmetical system of the acceptance system, here X, has to be accepted as unique, fundamental and pre-given.

This, obviously, is an extremely simple example, but it could explain, in a first step, the mechanism of diamond operations.

Things are getting easier to understand, if we assume that X belongs to an object-language and Y to a meta-language of the arithmetical system. Then the diamond is mediating at the very base of conceptualization between object- and meta-language constructions. From the point of view of the object language, the meta-language appears as an environment or a context taking place, positively, at the locus of rejection. Thus, a kind of an opposition between X and Y systems seems to be established. The other part of the diamond, the duality between proposition and opposition, necessarily to establish a diamond structure, is not yet very clear. We could re-write the constellation in Polish notation to get an easier result: =(+(2, 3), 5). Thus, the distinction between operator and operand is introduced and we simply have to redesign the diagram.

Some more topics

Categorical product

$$
\begin{tikzcd}
A & A\ \pi\ B \arrow[l, "p_{A,B}"'] \arrow[r, "q_{A,B}"] & B \\
& C \arrow[ul, "f"] \arrow[u, "<f,g>"'] \arrow[ur, "g"'] &
\end{tikzcd}
$$

$$Logic^{1}: \left[\begin{matrix} \forall C \\ \forall f, g \end{matrix} \right\rangle \exists! \langle f, g \rangle$$

<f,g>: acceptance

Diamond product

$$
\begin{tikzcd}
& D \arrow[dl, "\bar{f}"'] \arrow[d, "<\overline{f,g}>"] \arrow[dr, "\bar{g}"] & \\
A & A\ \pi\ B \arrow[l, "p_{A,B}"'] \arrow[r, "q_{A,B}"] & B \\
& C \arrow[ul, "f"] \arrow[u, "<f,g>"'] \arrow[ur, "g"'] &
\end{tikzcd}
$$

$$Logic^{2}: \left[\begin{matrix} \forall C^{o} \\ \forall f^{o}, g^{o} \end{matrix} \right\rangle \exists! \langle f^{o}, g^{o} \rangle$$

<f^{o},g^{o}>: rejectance

$$
\begin{tikzcd}
& D & \\
A \arrow[ur, "\bar{f}"] \arrow[r, "u_{A,B}"] \arrow[dr, "f"'] & A\ \pi\ B \arrow[u, "<\overline{f,g}>"] \arrow[d, "<f,g>"'] & B \arrow[ul, "\bar{g}"'] \arrow[l, "v_{A,B}"'] \arrow[dl, "g"] \\
& C &
\end{tikzcd}
$$

Diamond coproduct

Terminal and initial objects in diamonds

To each diamond, if there is a terminal object for its morphisms then there is a final object for its hetero-morphisms.

To each diamond, if there is a initial object for its morphisms then there is a final object for its hetero-morphisms.

In diamond terms, rejectance has its own terminal and initial objects, like acceptance is having its own initial and terminal objects.

But both properties are distinct, there can be a final (terminal) object in a category, and another construction in a saltatory.

Morphisms are ruled by equivalence; hetro-morphisms are ruled by bisimulation.

9.7 Graphematics of Chinese characters

This is an aperçu and not yet the fugue.

Gerundatives: chiasm (ming) of noun and verb in Chinese characters

"For instance, all or almost all Chinese characters are gerundative. This means that the nouns are in action. A good example of this in English is the word rain. Rain can be both an action and a thing, thus embodying a noun and verb state. Most Chinese nouns are of this form, which means a thing is what it is because of what it does.

French, on the other hand, is typically very abstract and essentialistic. This means that whenever one uses a noun, the noun is not seen as doing something, but rather, is seen as being something / having essential characteristics."

Matt Durski, Phenomenology: Cook Ding's Ming and Merleau-Ponty's Chiasm

Western sentences are propositions with semantic characteristics. The meaning of their nouns is embedded into the sentences conceived as propositions. Chinese characters as gerundives are pragmatic and thus are neither sentences nor nouns.

Diamonds are mediating acceptional and rejectional aspects of interactions. The logical place where operationality happens for propositions, is not a place inside a proposition, but the *composition* of proposition. Composition of proposition is realized by an operator which is itself not propositional. In propositional logic such operators are known as conjunction, implication, etc. Their operationality is well codified in syntactic, semantic or pragmatic rules. But the aim of logic is not to study the pragmatics of compositional operators but their truth-conditions in respect of their propositions.

The same happens with the composition for morphisms. In focus is the new morphisms constructed by the application of the composition operator, but not the operator in its operativity as such. In other words, the composition operator has no logical representation as such. Its own semantic is not inscribed in the composition of morphisms, only the construction of new morphisms as its products is considered.

If *"nouns are in action"*, as it is the case for Chinese characters, then their structure is not logical but chiastic. "*Noun in action"* means that the Chinese character is both at once, a noun with its *semantics* and an action, i.e., an *advice*, with its operativity. But nouns in Western grammar are not in actions (verbs), hence Chinese characters are not nouns in a grammatical sense. It is also said, that Chinese thinking is not sentence based, hence it has to be noun-based. But this seems to be obsolete.

A good candidate where to place a first attempt to formalize the chiasm (ming) of action / noun seems to be the chiasm of the compositional operator and its hetero-morphism in the *diamond* modeling of the categorical composition of morphisms. The operator of composition, the compositor, as such is not modeled in category theory. Only the conditions of composition, and the result to produce new morphisms is thematized. This is the *acceptional* part of the diamond, called category. This activity as such, reflected in its meaning, inscribed as a morphism, is realized by the *renvérsement* and *déplacement* of the compository activity as a hetero-morphism. This is the *rejectional* part of the diamond, called saltatory. Both together, the operationality of composition as the acceptional and its displacement as counter-meaning, represented as hetero-morphism, the rejectional part, are enacting a chiastic process / structure, opening up the arena for the inscription of a new kind of scripturality, which is implementing in itself the Chinese approach to writing with the Western approach to operative formal languages and operational paradigms of programming.

Graphematic metaphor for bi-objects

A graphematic metaphor for bi-objects may be the Chinese characters. They are, at once, inscribing, at least, two different grammatological systems, the *phonetic* and the *pictographic* aspects of the writing system, together in one complex inscription, i.e., character. The composition laws of phonology are different from the composition laws of pictography. Because in Chinese script, characters with their double aspects, are composed as wholes and not by their separated aspects, composition laws of Chinese script is involved into a complexion of two different structural systems.

It can be speculated that the phonological aspect is categorical, with its composition laws of identity, commutativity and associativity, while the composition laws of the pictographic aspect is different, and may be covered, not by categories but by saltatories. At least, there is no need to map the laws of composition for Chinese characters into a homogenous calculus of formal linguistics based, say on combinatory logic.

The Western writing system is based on its phonetic system.

> "*Pictophonetic compounds* (å`„fléö/å`êʃéö, Xíngsh?ngzì)
> Also called *semantic-phonetic* compounds, or phono-semantic compounds, this category represents the largest group of characters in modern Chinese.
> Characters of this sort are composed of two parts: a *pictograph*, which suggests the general meaning of the character, and a *phonetic* part, which is derived from a character pronounced in the same way as the word the new character represents."
> http://en.wikipedia.org/wiki/Chinese_character#Formation_of_characters

9.8 Heideggers crossing as a rejectional gesture

Druchkreuzung und Gegen den Strich.

Heidegger's *crossing* of words is inventing a poetic way of writing Chinese in German language.

The cross over the term Sein (being) is inscribing its chiastic interplay to be a noun and a verb at once, i.e., to be neiter a noun (notion) nor a verb (sentence).

The structural direction of crossing is inverse to the linear sequence of alphabetic writing.

9.9 Why harmony is not enough?

The aim of Chinese thinking and living is harmony as it is conceived by Confucius and further developed to toady to give an ethical foundation to the new China.

Harmony is a holistic concept; it is excluding the acceptance of the other in its unpredictable form and event structure of surprise.

The Chinese idea of harmony is not yet considering the complementary interplay between acceptional and rejectional aspects of a system, societal, legal, economic or aesthetic.

> "The central theme of the Confucian doctrines is 'the quest for equilibrium and harmony' (zhi zhong he). The whole tradition of Confucianism developed out of the deliberations about how to establish or reestablish harmony in conflicts and disorder. For Confucianism harmony is the essence of the universe and of human existence. Harmony was manifested in ancient time when virtues prevailed in the world."
> http://www.interfaith-centre.org/resources/lectures/_1996_1.htm
> http://uselesstree.typepad.com/useless_tree/2006/10/a_socialist_har.html