Rudolf Kaehr
(1942-2016)

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Abstract
The idea of dissemination tries to explicate and formalize a quite different intuition of combining institutions which is not producing diversity and multiplicity by combining a basic system as a product or sum or whatever construction but introduces multiple differences in the very concept of the basic system itself. After this construction a polylogical or polycontextural system can be combined in many ways. This idea of multitudes of basic differences in the notion of formality, taken seriously, is in fundamental contrast to the existing concepts of formality in mathematics. Obviosly, these multitudes are more fundamental than all types of many-sorted theories, or typed logics, or pluralities of regional ontologies, domains and contexts.

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Dissemination: Introducing the proemial relationship

There are many ways of combining abstract objects or institutions. ***For example, given two institutions INS1 and INS2 which, intuitively, are independent we can form their product. This product institution has all pairs of signatures from INS1 and INS2, respectively, as models, and sentences which are either sentences from INS1 or from INS2 with the obvious satisfaction relation."*** Cat., p. 357

It is shown, that ***the category of institutions is complete***.

The idea of dissemination tries to explicate and formalize a quite different intuition of combining institutions which is not producing diversity and multiplicity by combining a basic system as a product or sum or whatever construction but introduces multiple differences in the very concept of the basic system itself. After this construction a polylogical or polycontextural system can be combined in many ways. This idea of multitudes of basic differences in the notion of formality, taken seriously, is in fundamental contrast to the existing concepts of formality in mathematics. Obviosly, these multitudes are more fundamental than all types of many-sorted theories, or typed logics, or pluralities of regional ontologies, domains and contexts.

1 The idea of proemiality

A very first step in this direction was made by the philosopher Gotthard Gunther with his idea of a ***proemial relationship"*** introduced in his paper Cognition and Volition" (1970) about a Cybernetic Theory of Subjectivity.

In order to obtain a general formula for the connection between cognition and volition we will have to ask a final question. It is: How could the distinction between form and content be reflected in any sort of logical algorithm if the classic tradition of logic insists that in all logical relations that are used in abstract calculi the division between form and

content is absolute? The answer is: we have to introduce an operator (not admissible in classic logic) which exchanges form and content. In order to do so we have to distinguish clearly between three basic concepts. We must not confuse

a relation

a relationship (the relator)

the relatum.

The relata are the entities which are connected by a relationship, the relator, and the total of a relationship and the relata forms a relation. The latter consequently includes both, a relator and the relata.

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:

$R_{i+1}(x_i, y_i)$ *is given and the relaturn (x or y) becomes a relator, we obtain*

$R_i(x_{i-1}, y_{i-1})$ *where* $R_i = x_i$ *or* y_i. *But if the relator becomes a relatum, we obtain*

$R_{i+2}(x_{i+1}, y_{i+1})$ *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."*

Neither exchange nor ordered relation would be conceivable to us unless our subjectivity could establish a relationship between a relator in general and an individual relatum. Thus the proemial relationship provides a deeper foundation of logic as an abstract potential from which the classic relations of symmetrical exchange and proportioned order emerge.

It does so, because the proemial relationship constitutes relation as such; it defines the difference between relation and unity - or, which is the same - between a distinction and what is distinguished, which is again the same as the difference between subject and object.

It should be clear from what has been said that the proemial relationship crosses the distinction between form and matter, it relativizes their difference; what is matter (content) may become form, and what is form may be reduced to the status of mere materiality"."

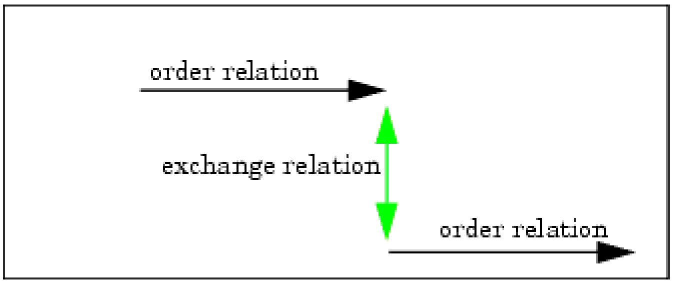
We stated that the proemial relationship presents itself as an interlocking mechanism of exchange and order. This gave us the opportunity to look at it in a double way. We can either say that proemiality is an exchange founded on order; but since the order is only constituted by the fact that the exchange 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. If we apply that to the relation which a system of subjectivity has with its environment we may say that cognition and volition are for a subject exchangeable attitudes to establish contact but also keep distance from the world into which it is born. 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

1.1 Some explanations of the idea of proemiality

The proemial relationship is therefore at first an interlocking mechanism of the two concepts of exchange and order or symmetry and asymmetry.

Diagramm 1



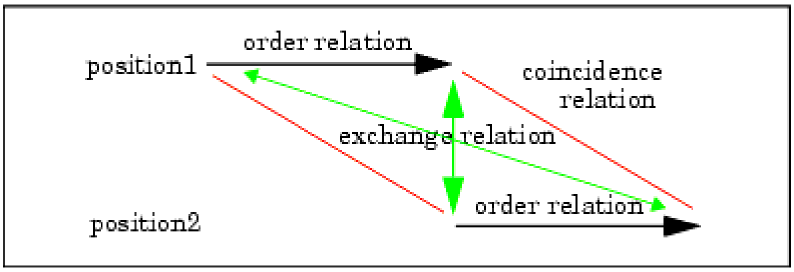
cascadic representation

A further explication of the intuition of proemiality is achieved if we consider the fact that the objects, the relator and the relata of the relations, have to fit together in a categorical sense. There is a similarity of the relators of different levels as well as for the relata of different levels in the sense that the different relators are relators and not something else. And the relata on each level are relata and not relators. For that I introduce the ***coincidence relation***, which designates categorical sameness (likeness, simiItude).

To finish the picture I introduce the exchange relation between the first" and the last" element of the interlocking mechanism of order and exchange relations. As a last step I mention the position, the ***logical locus***, of the order relations according to **the *higher or lower logical orders".***

PrObj = (Obj; Ord, Exch, Coin, Pos)

Diagramm 2



But this explanation still excludes the third term of the definition of a relation, the relation itself. Remember: ***We must not confuse a relation, a relationship (the relator), the relatum.***

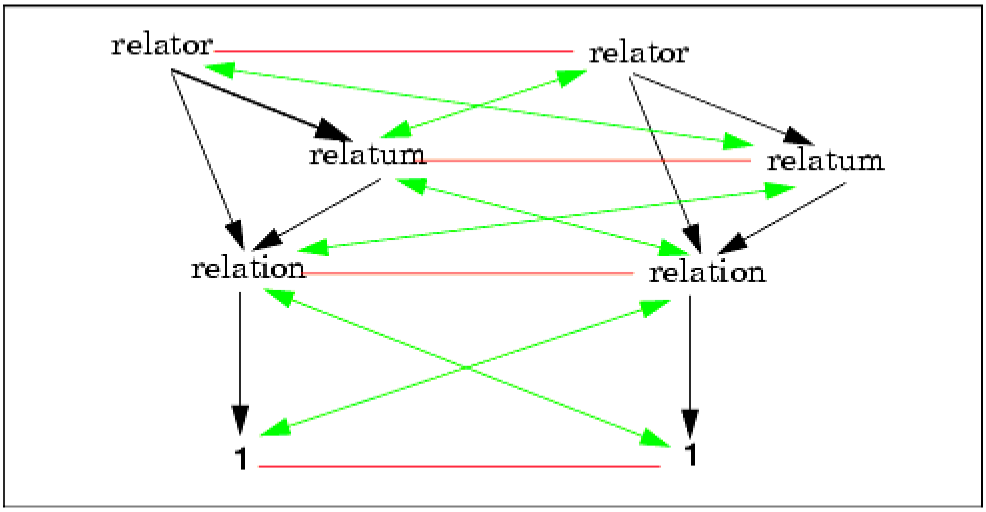
And finally I consider the fact that there is one and only one concept of relation and relationality under consideration. therefore the concept of relation is based on ***unicity (uniqueness)***, represented by 1. This is surely not a harmless statement, it suppose something like a common intuition of relationality or operativity which finds itself explained and formalized in some mathematical constructions which are accepted by the scientific community. Therefore, Gunthers chain "a ***relation, a relationship (the relator), the relatum"* has to be completed by the very concept of relation, that is, *relationality* based in *unicity.***

The full-fledged explanation, without the arrow "relation-->relationality", of the proemial relation over two loci is given by its conceptual graph. The scenario is the same for the distribution and mediation of other concepts, like operations, functions, categories, institutions etc.

Thus the definition has to be expanded to:

PrObj = (Obj; Ord, Exch, Coin, Pos)

with Obj = { relator, relatum, relation, relationality, unicity}



In this context it is not my task to defend this construction against the many attempts to reduce it to something else. To go further in the game I make the option that it will be useful for developing some new mechanisms of combining abstract objects like institutions, logics, arithmetics, category theories and more. In exercising this game the new intuition will shape itself into a more academic form.

After having introduced the idea of proemiality it would be possible to formalize it further and to develop a preliminary theory of proemiality, also sometimes called ***chiastics*** or ***theory of mediation***. The main thesis, therefore, is that proemiality offers a mechanism of combining institutions which doesn't belong to the universe of combining categories. This mechanism of combining institutions, e.g. distribution and mediation, is fundamentally different from the classical ones.

Despite of this difference this strategy is in no contradiction or opposition to the known principles of combining systems of logics.

It is simply something different and the clou would be to explain this difference in full. Don´t confuse the exchange of relator and relatum of a relation in the mechanism of the proemial relationship with the superposition of relator and relation in relational logics. There is no problem to apply a relator, or a operator or a functor to the result of a relation or operation or function as e.g. in recursion theory or in meta-level hierarchies.

Metaphor

If we proemialize the linguistic subject-object-relation of a sentence we shouldn't hesitate to be strictly structural. The example is borrowed from Heinz von Foerster.

"The horse is gallopping" (Das Pferd gallopiert), the interchanged sentence can only be "The gallop is horsing" (Der Gallop pferdet).

Nobody supposed that we are doing analytic philosophy.

1.2 Proemiality and Architectonics

1.2.1 About the as-category in proemiality

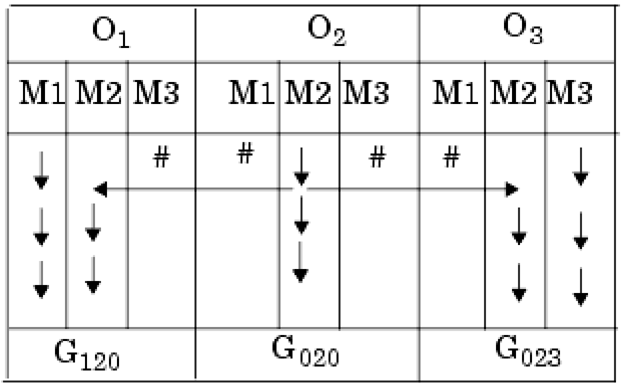
What I have developed so far is only the half of the story. Also it might be obvious that the wording of e.g. "the operator (of one system) becomes an operator (of another system)" is in strong conflict with the identity of its terms therefore this situation needs a more precise explication. It should be clear that a term which is in one system an operator and simultaneously an operand in another systems is split in its own identity. It is at once itself and something else. This term has at once two functions, to be an operator and to be an operand. Therefore, from the point of view of identity and its logic, this term is in itself neither an operator nor an operand.

What then is it? How can we define it more accurate? It is part of an chiastic interplay and we have to be more explicit with our wording. Instead of speaking of an "operator" or of an "operand", we should use the ***as-category*** and use the wording "an object X ***as*** an object Y ***is*** an object Z". Thus, an operator as an operator is simultaneously an operand.

An operator as an operand is an operand (of another operator)

1.2.2 About the architectonics of the as-category

To make this wording more precise I introduce a diagram which is well known from the tableaux method of formalized polycontextural logic.

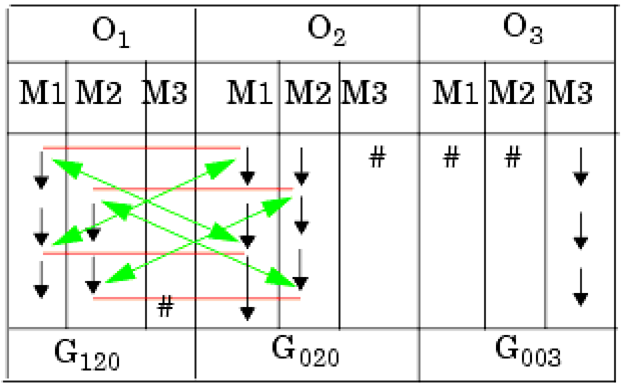


This type of diagrams was first introduced to deal in a proper way with the tableaux method in polycontextural logic. Especially to understand the functioning, and this gives probably also some light on its meaning, of the so called ***transjunctions***, I introduced this tabulation of the step-wise decomposition of signed formulas in tableaux proofs. Transjunctions have reached in different scientific and artistic areas some degree of acceptance and are widely used as important mechanism of subversive thinking and modeling. Also the number of occurrence of this term in literature is quite impressive there is not much scientific understanding to find.

Transjunctions are logical functions or operators which are involved in some sorts of bifurcations and are split into different parts belonging at once to different logical systems. They are therefore composed of partial functions in contrast to the total functions of classical logical junctions like conjunction, disjunction, implication and so on.

This change of logical system by bifurcation which presuppose the difference of an inside and an outside of a logical system is ruled by the proemial relation between the parts of the transjunction and the different logical systems involved. To the step-wise decomposition of a transjunctional formula corresponds an order relation, to the bifucation to other systems the exchange relation because of its inside/outside difference, and to the components and the steps of decomposition of the transjunctional formula as a whole the relation of coincidence. Therefore, the operation of transjunction can be understood as a proemial object.

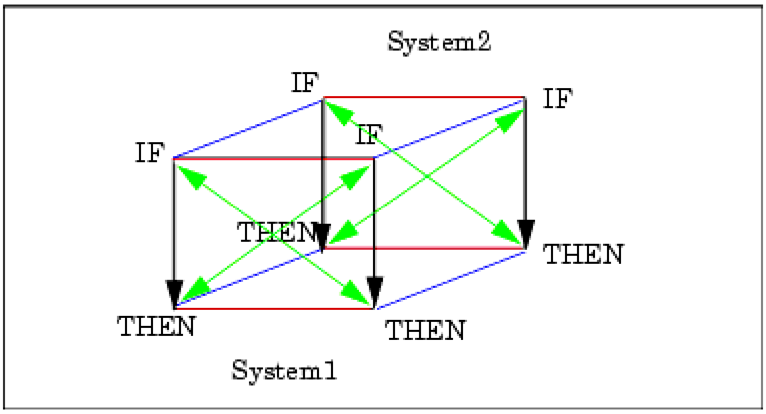
This diagram which gives some first steps in the design of polycontextural architectonics can now be used for further explications of the mechanism of proemiality.



The exchange between operator and operand has to be described simultaneously from both positions. That is why we have to realize a double description, a double gesture of inscribing the proemiality of the constellation. To visualize this prozedure we have to realize a double description of the diagram

The first diagrams are correct insofar as they describe the ***structure*** of proemiality. But at the same time they are abbreviations insofar as the ***process*** of reading them, that is to read them at once from both sides, is not inscribed. This process of reading has to be done by a reader. But we have to make it explicit and to visualize it. Therefore, even if it seems to be obvious, it has to be realized and not only be mentioned. The new diagram is focussing more the process of proemiality than on its general structure. To not to overload the scheme I reduced it to the distribution of the IF/THEN-relation. Maybe with all that in mind we are now reaching slowly the famous ***proemial cube***.

Diagramm 3



The proemial cube

Again, the green double arrow represents the exchange relation, the red line the coincidence relation, the black arrow the order relation, and, new, the blue line represents the distribution of the two proemial relations in a common ***architecture***.

I don´t comment the full combinatorics between all knots of the diagram. Also, I would like to leave the study of further dimensions of visualizations and their explanations as an interesting job to the programmers. In this text DERRIDA´S MACHINES I will reduce my presentation to the graphically more simple case of the visualization of the structure of the concept of proemiality and its applications, that is, to the two-dimensional diamond diagram instead of the cube.

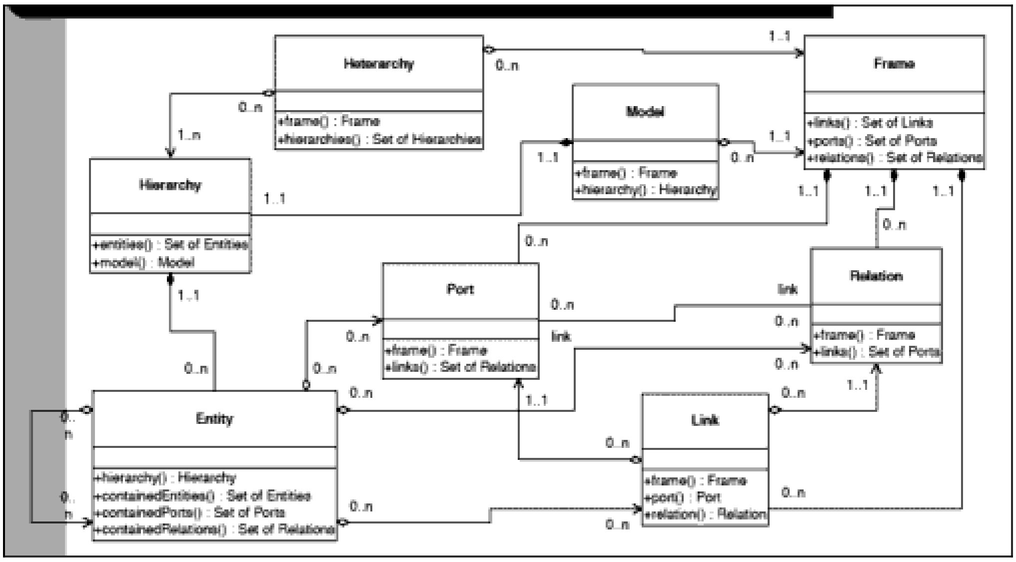
1.3 Proemiality and Heterarchy in a UML Framework

To give a more transparent modeling of the proemial relationship it maybe helpful to set the whole construction and wording into an UML diagram and to use the modeling of heterarchy worked out by Edward Lee as a helpful tool to explicate proemiality in terms of UML modeling.

Also the proemial relationship is not restricted to ontology and the distribution of hierarchical ontologies in a heterarchic framework and despite the fact that UML has no mechanisms of category change, metamorphosis and mediation it seems to be a helpful exercise to find a correspondence between the UML heterarchy diagram and the construction of proemiality which is more based on elementary terms of relationality. The heterarchy diagram is a class diagram which models the static structure of the system. Proemiality has, also it is fundamentally dynamic, its static aspects. It is this static aspect we can model with the help of the UML heterarchy diagram.

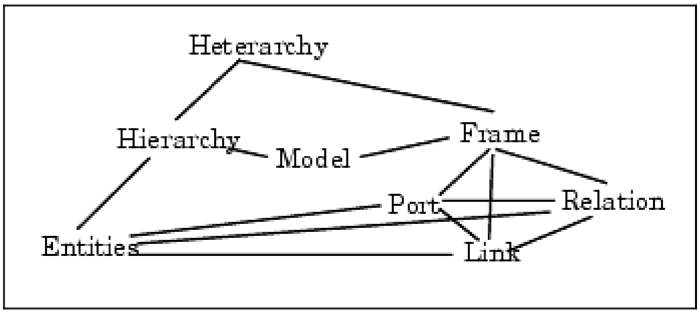
A further step of UML modeling of proemiality will have to involve more dynamic models like interaction and activity diagrams.

Diagramm 4



UML diagram of heterarchy in: Edward A. Lee, Orthogonalizing the Issues, UC Berkeley

What is the difference in modelling between conceptual graphs and UML diagrams?



A conceptual graph of the UML heterarchy diagram.

1.4 Complementarity of dissemination and togetherness

Complementary to the notion and procedure of dissemination, which is motivated by the necessity of constructing complex and polycontextural systems out of simple ones, that is, mono-contextural systems, we have to consider the poly-contexturality of the complex system as such. One first category we observe is the category of ***togetherness*** of the local systems in the complex and inter-acting wholeness.

Another category that emerges naturally out of the disseminated systems is the category of ***wholeness*** or more precise the category of ***super-additivity*** of disseminated systems.

In this sense, dissemination is a process of disseminating single systems and at the same time it is the wholeness, the togetherness of the disseminated systems. This is also included in the notion of dissemination as a process of distribution and mediation of systems. Dissemination is always both: multitude and wholeness.

2 Combinatorics of chiastic changes of categories

2.1 Conservative mappings or Category theoretic combinations

If the contextural differences between two objects are denied we can ***model*** the relationship between them in terms of morphisms in the category theoretic sense.These morphisms are the structure preserving mappings of names to names, sorts to sorts, operations to operations, equalities to equalities, and unity to unity., etc. of the abstract objects. But again, in this case we are neglecting the fact, that they belong to different logical contextures.

On the other hand, if we take their contextural differences into consideration, these mappings are preserving the tectonical structure of the systems, despite their logical incompatibility. In terms of proemiality these mappings are not of the sort of order relations, like morphisms, but of the sort of coincindence relation. In a category theoretical model they would be some identity morphisms or isomorphisms.

2.2 Metamorphosis or Proemial combinations in abstract objects

1 Chiasm of sorts and names: CHI (sorts, names)

This is similar to the chiasm of sorts and the universe (of sorts) in a many-sorted logic.

It seems not to be unnatural that a sort can change into a name of a new object and on the other side a name as being hierarchically superior to the sorts can change into a lower level object as a sort in another contexture.

But this seems to be an ordinary procedure for interacting systems. The conceptualizing process of different agents can differ exactly in the sense that for one agent the set of sorts or of one of the sorts of the other agent corresponds to the name, that is, the whole or contexture of his own system. In contrast, what is the whole scope of one agent can be a sort with many other sorts for another agent. There is nothing magic with that. And there is also no reason for unsolvable conflicts if both are aware about this situation and understand the mechanism of change between each other. This common understanding can be modelled or realized in a further system, without being forced to negate the differences between the two agents.

Sorts and names occurs on different levels of the conceptual hierarchy. The mechanism is generalization and reduction or specialization of concepts.

2 Chiasm of sorts and operations: CHI (sorts, opns)
3 Chiasm of operations and equations: CHI (opns, eqns)
4 Chiasm of names and operations: CHI (names, opns)
5 Chiasm of names and equations: CHI (names, eqns)
6 Chiasm of unicity and names: CHI (unicity, names)

Unicity can be understood as the ***contexture*** of the local abstract algebra. Classical theories have not to be concerned with their contexture and uniqueness because they are unique per se, that is they are mono-contextural. Because of their uniqueness there is no reason to notify it by a special term like 1.

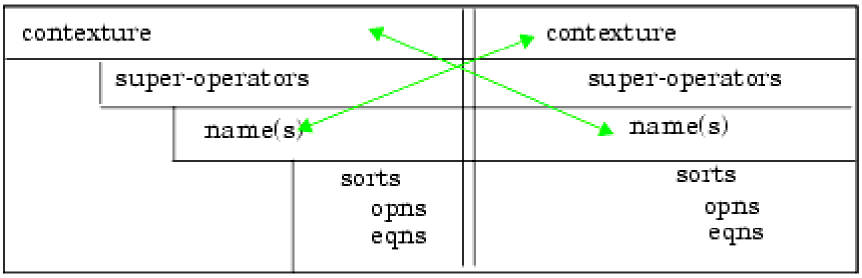
Because the unicity (unity) is absolute, every possible change of it has fundamental consequences for the whole framework of reasoning. The chiasm between the absolute unicity (uniqueness) and the relativity of the names denies a simple mapping of the loci of the different systems onto the linearity of natural numbers. The chiasm between unicity and the other has no beginning and no end.

The chiasm is the mechanism of change. To connect the different unitizes with numbers we have to abandon the idea of an initial object, a starting point of the number series. Natural numbers, as we understand them, are constructed by algebras, induction and initiality. As a first step, we can try to model the chiastic situation in the context of co-algebras, co-inductivity and finality. This chiastic way of thinking is closer to the metaphors of ***streams*** and flows, and the lack of ultimate beginnings and endings as origins and telos.

More precisely, we should think of the chiastic paradigm as an interlocking play of algebraic and co-algebraic strategies and methods.

With this in mind, all attempts to formalize polycontextural systems, logics and arithmetics, with the methods of category theory alone have to be relativized. It is nevertheless of great importance to start the process of formalization of polycontexturality with the methods which are accessible. One very strong method, which is well accessible, is the method of fibering or indexing (Pfalzgraf, Gabbay). In other terms, the method of mapping local systems to an index set as a vehicle of distribution of formal systems. But this procedure involves the whole apparatus of the algebraic paradigm: equality, identity, linearity, initiality, inductivity, etc. Which, as I tried to make clear, is in strong conflict to the very idea of proemiality and its chiastic mechanisms.

The chiasm between names and contextures (unicity) is of great importance for a serious modeling of reflectional computation because it opens up the possibility of a distributed ***self-referentiality*** between systems as wholes. Furthermore, names in a contexture can be interpreted as the ***reflectional mapping*** of other contextures into the reflecting contexture.



2.3 Chiasms, metamorphosis and super-operators

The super-operation CHI can be interpreted as the operator of changes of categorical perspectives, contexts or contextures and points of view.

These possibilities of changing the categorical terms is exactly what makes the difference between chiasms and category theoretic morphisms which are preserving the conceptual structures of the system in the process of mapping it into another system.

Proemiality incorporates both, category theoretical and chiastic morphisms.

Chiastic morphisms are not conservative in the sense that they are preserving the tectonical or conceptual structure of a system but more subversive in the sense quite analog to the catastrophes in Thom´s Catastrophe Theory that they are changing and not preserving the conceptual order. These morphisms are in a strict sense not only forgetful mappings but rules of metamorphosis.

Chaotic Logics

Chaotic logics are not the logics of chaos but the logics of change.
Change in chaotic systems is not a continuos process but the switch from one mode to another mode of a system by some changes of the states of the system.
Chaotic logics are the logics of interacting logical systems.
Changes in chaotic logics are modeled by transcontextural jumps from one system to another system and are defined in sharp contrast to the intracontextural steps of the expansion rule in a singular system. Transjunctional jumps don't exclude the possibility to stay in the primary system at the same time of the jump.
Cybernetic Ontology
Order from Noise.
####

As a consequence of these first insights, in this chiastic part of the proemial relationship, the category theoretic laws of identity and associativity are lost, or at least fundamentally transformed.

The possibility of metamorphosis is given by the interlocking mechanism of the chiasm. Also the super-operators had been introduced primarily to deal with contextures as such there is no reason to not to apply these operators to the internal structure of the contexture, that is here, to the internal structure of the abstract objects. Therefore the general operator of metamorphosis is composed, at first, by the super-operators {ID, PERM, RED, BIF).

This allows, that there may be an identity relation ID between to contextures and changes in their internal structure with e.g. sort1 in contexture1 becomes sort2 in contexture2 produced by the super-operator PERM. Or, the contextures and the sorts are stable, but the internal operations of the contextures may change.

It is not excluded in this chiastic concept of architectures of different systems, that for one system all the differences of the other system boils down to one notion. This would be a further step in mapping the architecture of one system into another system. Maybe that the interlocking mechanism between the systems would be reduced to a strong reduction produced by the extensive application of the super-operator RED to all categories of the system in consideration.

From the point of view of proemiality, metamorphosis is not a simple confusion of the categorical framework but a well ruled or at least rule guided change of categories in the process of change, emanation and evolution or other types of transformations. This type of metamorphosis is not wild in the sense of the absolute novum, because its scenario is founded on the known categories (names, sorts, operations, etc.) of the systems in transformation. If we would choose an other setting instead of algebras, we would have a similar scenario of change within the framework of the defining concepts. Another type of change could be thought for the case where the transformation changes to categories unknown before. For this case we would be forced to ad to our framework of proemial change between categories something like an empty box for the unknown. Why not?

Again, the process of transformation ruled by the proemial relationship has not to happen only between objects of the same architecture, like algebras to algebras. It also can happen between objects of different architectures. An interesting case could be the change between algebras and co-algebras. The same situation is to observe between distributed category systems. Morphism in one system can change to objects in another system of categories. Or even the very concept of category of one system can be transformed in a mere object of an other system. And so on.

Usual mathematical practice?

Computer scientists have far more flexible view of formalism and sematics than traditional logicians. What is regarded as a semantic domain at one moment may later be regarded as a formalism in need of semantics."

M.P. Fourman, Theories as Categories, in: Category Theory and Computerpogramming, Springer LNCS 240, p. 435, 1986

I don't say that this is not the way mathematicians are anyway working. But it seems to be obvious that they are not reflecting or even formalizing this process, this use of terms and methods, that is their actual practice of doing creatively mathematics. Without ever mentioning what this means and how it is formalized, the as".

Maybe computer scientist have a more flexible use of formalisms than logicians. But logicians have not only produced most of these formalisms long before but also know very well that they are dealing with highly idealized situations governed by the principle of identity.

On the other side, philosophers and philosophical logicians have developed much work in explaining the ***as-category*** of thinking and being (analogy). But what is called, especially in European philosophy, hermeneutics, denies any possibility of formalization of the as-category. We also shouldn't confuse the as-category with the more popular as-if-category of fictionalism (Hans Vaihinger) and constructivism.

It would be very interesting to start some case studies of this practice of computer scientists and mathematicians. A very interesting case would be the way or working with swinging types, that is the ***switch*** from algebras to coalgebras and back, in the sense of Peter Padawitz.

Or more traditional: In the summer term you get ***Logics as algebras***, in the winter term they offer you ***Algebras as logics***. And in-between you enjoy the summer holidays to forget any possible conflicts.

Translations, Goguens Semiotic Algebras

It turns out that correct translations are conservative metamorphosis.

Maybe the main problem of machine translation is just this decision, to start with conservative translations and to try to model common sense texts, which are full of games of violating this conservativity, with this restricted approach. In other word, conservative translations are based on disambiguated and context free semantics. A case which is very artificial and doesn't match natural language at all.

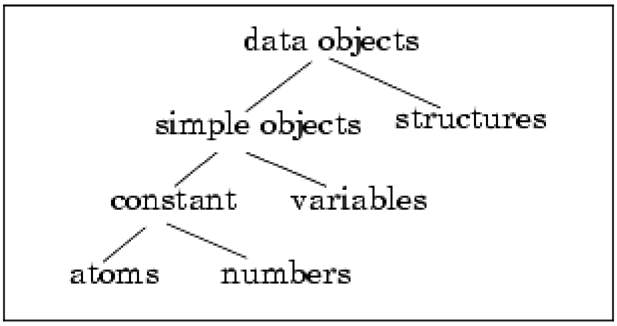
A conservative example: conflicts in the tree of data objects

All programming languages are based on very strict and stable conceptual structures. If the data objects are introduced as an ordered system like the tree of data objects", this structure will never be changed in the process or execution of a program (Programmablauf). If something would be changed in this order it would automatically produce serious conflicts.

Because of the fact, that classical programs are essentially mono-logic, there is no space for conflicts in a positive sense. But real systems, that is interacting systems as today computing, are permanently confronted with conflicts. Why not introducing dialogs in the very structure of programming languages and systems? I'm not writing here about special interactive programs, e.g., but on the architecture and fundamental conceptuality or definition of programming languages as such and not of special applications of these languages. Like interactive proof systems or interactive games.

There is an easy way of producing conflicts in a dialogical system, if e.g. L1 declares A as a simple object and L2 declares simultaneously A as a complex object, that is a structure. Obviously it is possible, in the polycontextural approach, to model this conflict and to resolve it in another logical system, say L3, this without producing a meta-system subordinating L1 and L2.

Diagramm 5



Tree of data objects

Furthermore, the conflict has a clear structure, it is a metamorphosis of the terms simple object" in L1 and structure" in L2. This metamorphosis is a simple permutation between sorts over two different contextures based on the chiastic structure of the mediation of the systems. But it respects the simultaneous correctness of both points of view in respect of being a simple object" and being a structure". In this sense it can be called a symmetrical metamorphosis.

Today computing is often characterized by its interactivity. But the programming languages have not changed to respond to this situation. They are still, in principle, mono-logic.

A further example of an interchange between programming languages would be the chiasm between data objects and control structures.

A very shy implementation of this interlocking mechanism, with far reaching consequences, is at the basis of all artificial intelligence attempts, the internal difference and possible ambiguity in LISP between data and programs ruled by the QUOTE/EVAL function.

These examples should not be confused with contradictions arising by a conflict in attributes between different informations. This implies a logical and linguistic level of communication and doesn't touch the categorical framework of interaction.

After Wegner, interactions are paraconsistent, or at least belong to a paraconsitent type of logic. This maybe true on a linguistic-logical level, but it is not in correspondence with a more achitectonic and chiastic view of interactivity.

blind spots

Strategies of detecting the ontological, logical, computational, epistemological, reflectional, and what ever, blind spot of an interacting agent.

2.4 A simple typology of chiasms

To study some aspects of chiasms we can restrict ourself to the study of the interplay between relators and relata, neglecting the full-fledged exposition of the chiasm with its concept relation and unicity (uniqueness).

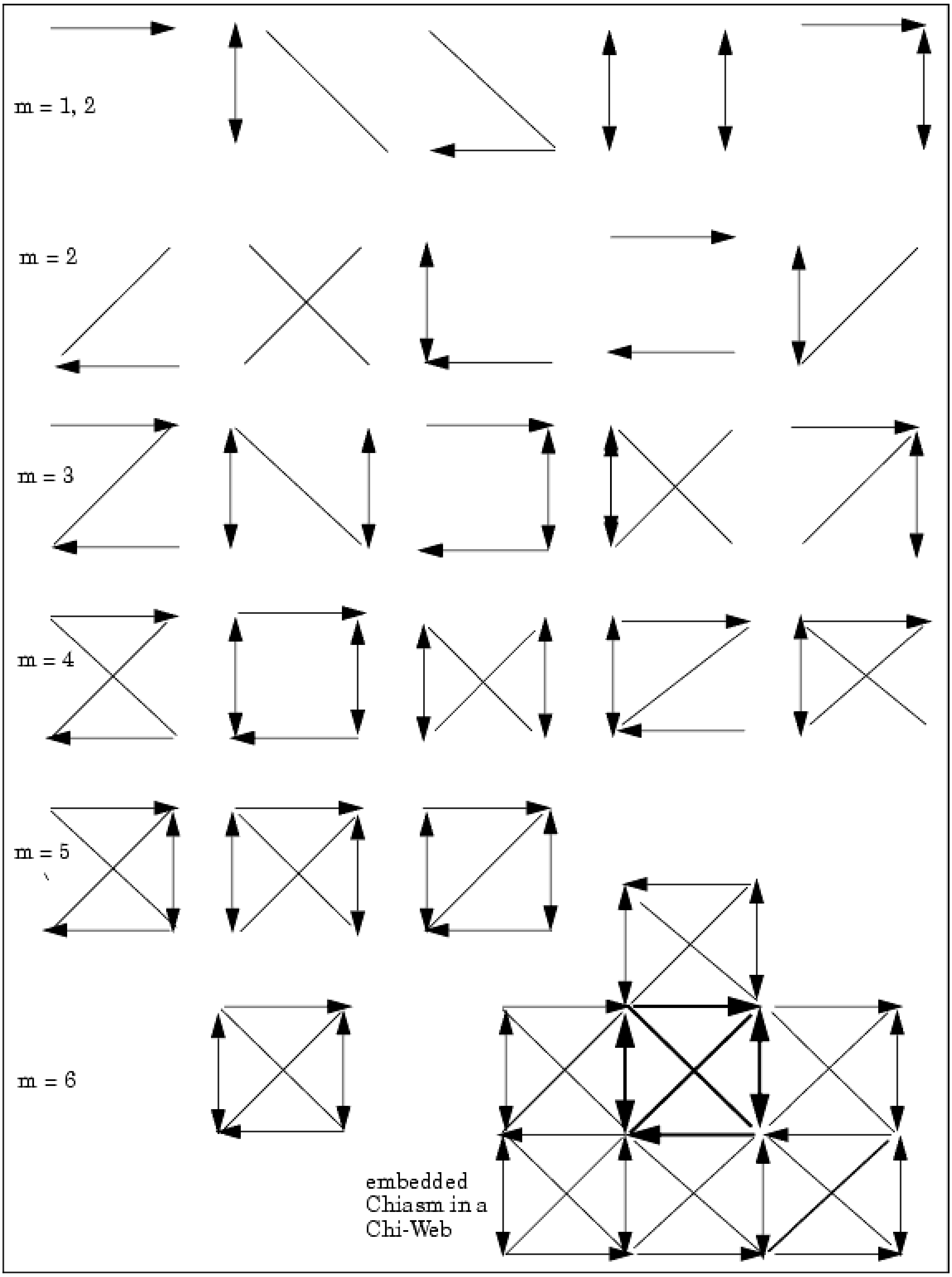
In practice it is easy to discover that many variants of realizations of chiasm are in the epistemological play. Mostly, chiasm are not fully designed, reductions are used and some times the use is over-determinated.

We can classify the single chiasms as balanced, under- and over-balanced. As distributed and embedded chiasms we can distinguish two modi of distribution, iteration and accretion and its combinations.

2.4.1 Iterations of chiasms
2.4.2 Accretions of chiasm
2.4.3 Mediation of iteration and accretion of chiasms
2.4.4 Over-determination of chiasms

2.4.5 Examples of under-balanced chiasms

Diagramm 6



Examples of chiasms

3 Proemiality between structural and processual understanding

3.1 F o r m a l L o g i c , To t a l i t y and T h e S u p e r - a d d i t i v e P r i n c i p l e

in: Gotthard Günther
Beiträge zur Grundlegung einer operationsfähigen Dialektik, Band 1,
Meiner Verlag, Hamburg, 1976, p.329-351, first publ.: BCL Report, 1966

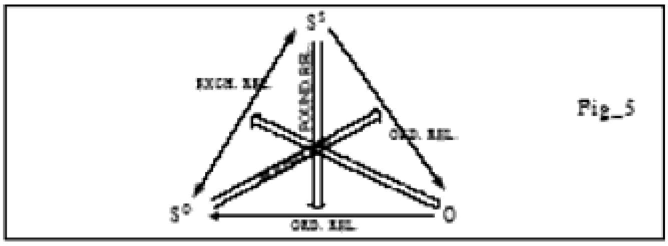
We have given the main reason above: if the relation between thought and its object is basically understood as a symmetric exchange relation the phenomenon of subjectivity disappears. But a "totality" in which everything is reduced to objectivity can never be total because something is missing.
A totality is, in Hegel´s terminology:
1) an iterated self-reflection of
2) a non-iterated self-reflection, and
3) a hetero-reflection.

If we permit, for the description of this structure, only logical operations which lead to reflection-symmetry then 1) is eliminated, and 2) and 3) turn out to be indistinguishable and logically identical ... because 1) is nothing else but the capacity of keeping 2) and 3) apart.

(...)

However, if the concept of the universal subject, i.e. of ´Bewusstein überhaupt´(Kant), is eliminated the logical constraint to reduce everything to ultimate parity relations disappears. We will still have reflection-symmetry between SS and SO but not longer between S°-°-°- and O in general. In other words: it will turn out that the founding relation between subject and object or between Thought and Being is not a symmetrical exchange relation but something else. This is the point where the transition is made from formal classic logic of Aristotelian type to a theory of trans-classic, non-Aristotelian Rationality.
We begin by re-drawing Figure 1 omitting SU and having the phalanx of the SO replaced by a single S with the index O. We

indicate the relations between SS , SO and O by arrows of four different shapes. According to the logical character of the relation an arrow will either be double-pointed or it will have one shaft or be double-shafted having either continuous or dotted lines. Figure 5 will then show the following configuration:



If SS designates a thinking subject and O its object in general (i.e. the Universe) the relation between SS and O is undoubtedly an ordered one because O must be considered the content of the reflective process of SS. On the other hand, seen from the view-point of SS any other subject (the Thou) is an observed subject and it is observed as having its place in the Universe. But if SS is (part of) the content of the Universe we obtain again an ordered relation, this time between O and SO. There remains the direct relation between SS and SO. This is obviously of a different type. SO is not only the passive object of the reflective process of SS. It is in its turn itself an active subject which may view the first subject (and everything else) from its vantage-point. In other words SO may assume the role of SS thus relegating the original subject, the Self, to the position of the Thou. And there is neither on earth nor in heaven the slightest indication that we should prefer one subjective vantage-point for viewing the Universe to another. In short, the relation between SS and SO is not an ordered relation. It is a completely symmetrical exchange relation, like "left" and "right". An ordered relation between different centers of subjective reflection comes into play only if we re-introduce the concept of a universal subject which contains all human "souls" as computing sub-centers. Of the two relations we have so far considered, the exchange relation is symmetrical and the ordered relation represents non-symmetry.

This investigation intends only to show that the concept of Totality or Ganzheit is closely linked to the problem of subjectivity and trans-classic logic and that it is based on three

basic structural relations:

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.

It may be said that the hierarchy of logical themes as indicated in table (II) represents an hierarchy of implicational power. All themes have in common that they are self-implications; they imply themselves. However the first theme (objective existence) implies only itself and nothing else. In this respect it differs from any succeeding theme which implies itself as well as all subordinated themes. For this reason it is proper to call the initial theme "irreflexive" and all the following "reflexive". Irreflexivity means that something we think of is only an implicate but not an implicand for something else. On the other hand if we refer logically to reflexivity we mean that our (pseudo-)object of thought is an implicand relative to a lower order and as well an implicate relative to a theme that follows it in the hierarchy of table (II).

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.

It is now necessary to remember that the possibility of coexistence of two independent subjects (I and Thou) in the Universe is based on an exchange relation between equipollent centers of reflection. Moreover, these subjects are all capable of being implicands. More objects do not operate inferentially. That means they do not imply anything else.

If we now consider the founding relation in which a subject constitutes itself as diametrically posed relative to all objects and the total objective concept of the Universe we will discover that this relation represents an interesting synthesis

of 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.
10
exchange and order. The founding relation is in itself an exchange relation in so far as the linking subject (SS) may assume the logical position of the other subject which is thought of (SO). SO may in its turn assume the rank of SS. Any two centers of subjective reflection of the same order mutually imply each other. But such an exchange does not operate between S°-°-°- and O. As we pointed out before: the bona fide object cannot infer the subject and by doing so usurp the role of a subject. If it could it would imply that subjects are irreflexive entities which for a subject is a contradictio in adjecto. It follows that the relation between implicate and implicand has two different aspects: between two subjects this relation assumes the role of a symmetrical exchange. Between subject and object it appears however as an ordered relation. The founding relation is therefore also an ordered relation. Or to put it differently: the founding relation is a combination of exchange and order. What is the implicand (SS) may become the implicate not relative to O but to our impartial observer S S S. We might say that the founding relation is a concatenation of sequences of exchange and sequences of ordered relations.

The diagram of Fig._6 will illustrate what we mean:

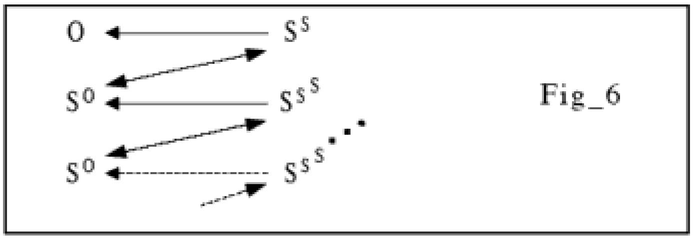


Fig._6 indicates a sequence of single-pointed and a second sequence of double-pointed arrows such that a single-pointed arrow always alternates with a double-pointed one.
A concrete example of what the figure illustrates is the father-son relation. This is first an ordered relation. But the son can also become a father. In this sense father-son is also an exchange relation. But the son does not acquire the status of father relative to his own father but relative to the grandson of his father.
In abstract terms: what is member (or argument) of the ordered relation O¬SS, namely SS, may become an argument

of an exchange relation not relative to O but relative to S S S which implies this exchange SS«SO.

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).
As Hegel pointed out in his dialectic logic one and a half centuries ago, the opposition of hetero- and self-reflection is not a parity relation because it requires an iteration of self-reflection in contrast to the non-iterative character of hetero-reflection. It follows as was pointed out above, that one value is sufficient to designate in hetero-reflection but two values are required - apart from the value S S
S O
O
S S S
S O S S S
Fig_6

for object-designation - to separate self-reflection from the object. This is confirmed by the character of the founding-relation. Table (VI) clearly shows that it requires a minimum of three values for its own establishment. But the introduction of a third value generates a new principle of superadditivity.

3.2 Irreflexivity as the ultimate beginning

In contrast to my working hypothesis "There is no origin, only a multitude of beginnings" irreflexivity in Gunther´s approach to the founding relation has the value of an ultimate beginning, which is the origin in its unicity. This origin is characterized as a self-implication.

It may be said that the hierarchy of logical themes as indicated in table (II) represents an hierarchy of implicational power. All themes have in common that they are self-implications; they imply themselves. However the first theme (objective existence) implies only itself and nothing else. In this respect

it differs from any succeeding theme which implies itself as well as all subordinated themes. For this reason it is proper to call the initial theme "irreflexive" and all the following "reflexive". Irreflexivity means that something we think of is only an implicate but not an implicand for something else.

To start proemiality (founding relation) with a beginning in the sense of an origin is not included in the general definition of the founding relation. It is an additional decision, based on special ontological interests.

Neither the abstract formulation nor the example given, father-son-relationship, involves an ultimative beginning. Otherwise the father-son-relationship connoted with an origin would force us to accept a "Ur-father". Maybe God. But this is not philosophical thinking.

To interpret proemiality as having a beginning is guided by the principle of well-foundedness. This principle is necessary for an algebraic or constructivist approach. In contrast to this interpretation of the founding relation it is equally possible to understand this mechanism in a non-founded way of coalgebraic co-induction.

As an example we may think of a chain of alternating Xs and Ys withaout an origin nor an end:

...XYXYXYXYX...

Is it reasonable to take X or alternatively Y as the start element of the chain? Obviously not. It maybe, in some special situations, a reasonable decision to take Y as the start.

We might say that the founding relation is a concatenation of sequences of exchange and sequences of ordered relations.

The same is true for the concatenation chain of order and exchange relations. But this decision is arbitrarily and not part of the mechanism of the founding relation.

To make these two interpretations more clear, I introduced in my ***Materialien 1973-75*** the distinction between ***open*** and ***closed*** proemial relationship.

Even if we accept that the environment of a living system has in contrast to its modeling of it an irreflexive character for the modeling system, it is important to see that this irreflexivity is of relative nature. Otherwise it will be very difficult for a cognitive system to have different interpretations of its environment and to change its ontology.

Many constructivists have introduced the distinction between reality and objectivity (Maturana) to deal with this difficulty. In their approach irreflexivity is pure reality, which as such escapes any knowledge. On the other side objectivity is a result of the process of interpretation. But since Kant we should know that this trick is not properly working.

1 Computational Ontology and the Problem of Identity

***Already Heraclitus pointed out that the notion of identity is not completly clear. But mathematicans prefer to proceed as if Heraclitus had not lived. I cannot continue in this way, this situation when an infinite process can be imbedded in an finite object is anordinary one in investigations of distinct natural number series, and I shall need an apparatus for the explicit consideration of all identifications used in such cases."* A. Yessenin-Volpin**

"Real-world computer systems involve extraordinarily complex issues of identity. Often, objects that for some purposes are best treated as unitary, single, or "one", are for other purposes better distinguished, treated as several.
Thus we have one program; but many copies. One procedure; many call sites. One call site; many executions. One product; many versions. One Web site; multiple servers. One url; several documents (also: several urls; one Web site). One file; several replicated copies (maybe synchronized). One function; several algorithms; myriad implementations. One variable; different values over time (as well as multiple variables; the same value). One login name; several users. And so on.
Dealing with such identity questions is a recalcitrant issue that comes up in every corner of computing, from such relatively simple cases as Lisp's distinction between eq and equal to the (in general) undecidable question of whether two procedures compute the same function.
***The aim of the Computational Ontology project is to focus on identity as a technical problem in its own right, and to develop a calculus of generalized object identity, one in which identity -- the question of whether two entities are the same or different -- is taken to be a dynamic and contextual matter of perspective, rather than a static or permanent fact about intrinsic structure."* Brian Cantwell Smith**

By the way, what is static and what is dynamic may be in the eye of the beholder. `We suggest...that many grammatical frameworks are static formalizations of intuitively dynamic

ideas´,.." Yuri Gurevich

Current OO notations make no distinction between intra-application variability, for example, variability of objects over time and the use of different variants of an object at different locations in an application, and variability between applications, that is, variability across different applications for different users and usage contexts."
K. Czarnecki, U. W. Eisenecker, Generative Programming

1.1 Identity

1.2 Equality

1.3 Bisimulation

By identifying two states with same external behavior, we get an extensional notion of equality, that can be captured by the following axiom:

Axiom 2.4. **Two states are considered equal if they cannot be distinguished by (a combination of) observations.**

To a user, again, the state may remain hidden, it is irrelevant, as long as the automaton implements the desired regular expression. Again, two states may be identified, if they behave the same way on the same input, which is to say, if they cannot be distinguished by any observation."

I am refering here to the great book ***Modal Logic*** (Blackburn et al.).

Bisimulation - the Basic Case

We first give the definition for the basic modal language.

Let M = (W, R, V) and M´= (W´, R`, V`) be two models.

A non-empty binary relation Z WxW`is called bisimulation between M and M`if the following conditions are satisfied:

(i) If wZw`then w and w`satisfify the same letters.

(ii) If wZw`and Rwv, then there exists v`(in M`) such that vZv`and R`w`v´ (the ***forth condition***).

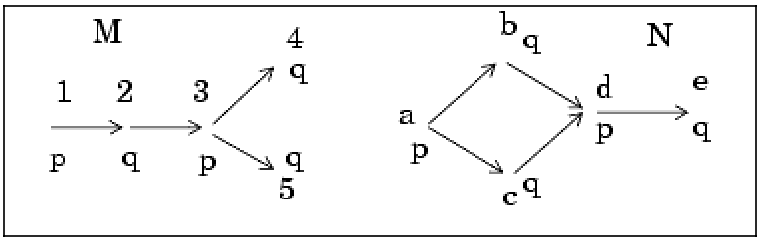
(iii) The converse of (ii): if wZw´and R`w`v`. then there exists v (in M) such that vZv`and Rwv (the ***back condition***).

Example:

The two models M und N are bisimilar.

Z = {(1,a), (2,b), (2,c), (3,d), (4,e), (5,e)}

Diagramm 1



Bisimilar Models

To show the bisimilarity of M and N, we define the relation Z. Condition (i) of our definition is satisfied: Z-related states make the same prpositional letters true. Moreover, the back and forth conditions are satisfied too: any move in M can be matched by a similar move in N, and conversely.

The two models are showing the same behavior in respect to the relation Z, therefore they are bisimilar.

"Quite simply, a bisimulation is a relation between two models in which related states have identical atomic information and matching possibilities."

"Examples of bisimulations (...) disjoint unions, generated submodels, isomorphisms, and bounded morphisms, are all bisimulations."

Bisimulation, Locality, and Computation

"Evaluating a modal formula amounts to running an automaton: we place it at some state inside a structure and let it search for information. The automaton is only permitted to explore by making transitions to neighboring states; that is, it works locally.

Suppose such an automaton is standing at a state w in a model M, and we pick it up and place it at state w´in a different model M´; would it notice the switch? If w and w´are bisimilar, no. Our atomaton cares only about the information at the current state and the information accessible by making a transition - it is indifferent to everything else. (...)

When are two LTS (Labelled Transition Systems) computationally equivalent? More precisely, if we ignore practical issues (...) when can two different LTSs be treated as freely exchangeable (óbservationally equivalent´) black boxes? One natural answer is: when they are bisimilar.

Bisimulation turns out to be a very natural notion of equivalence for both mathematical and computational investigations." p. 68

Morphograms and Bisimulation

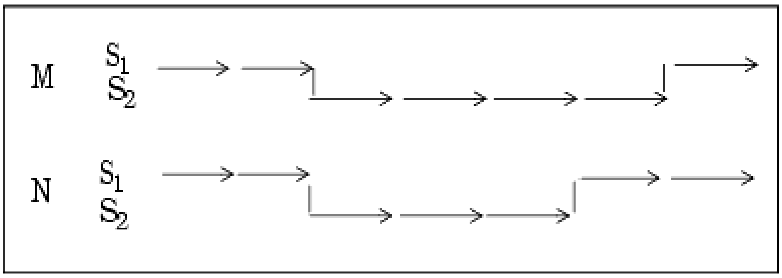
We can now apply the idea of Bisimulation directly to our study of the behavior of morphograms in kenogrammatical systems.

For example, lets interprete morphogram MG = (aabcbcbaa) as Trito-Number TZ = (00121211).

Das Verhalten dieser Trito-Zahl ist jedoch nur über ihre Aktionen in beobachtbaren Systemen bzw. Kontexten zugänglich und diese seien hier ihre binären Komponenten.

Die Trito-Zahl TZ zeigt zwei Verhaltensweisen, die sich in zwei Modellen des Verlaufs der Binärsysteme darstellen lassen.

M = (S**1122221**) und N = (S**1122211**). M und N unterscheiden sich an der zweitletzten Stelle bzgl. S**2** und S**1**. Die Knoten bzw. states der Modelle werden als die Belegungen des Morphograms durch Zahlen, d.h. der Trito-Zahl interpretiert. Die Zahlen als states haben einen Index, der angibt zu welchem Subsystem S**1** oder S**2** sie gehören bzw. den Übergang (Sprung) markieren.



Da das Morphogramm MG als solches nicht direkt zugänglich ist, dafür jedoch die zwei Modelle des Verhaltens des Morphograms, lässt sich aus der Bisimulation der zwei Modelle M und N auf die Struktur des Morphogramms schliessen. D.h. die Bisimulation zwischen M und N erzeugt eine Äquivalenz bzgl. des Verhaltens bzw. den Manifestationen des Morphogramms.

In dieser Thematisierung erscheint ein Morphogramm als die Klasse aller seiner bisimilaren Modelle. Nach der Terminologie von ***hidden*** und ***visible algebras***, sind die beobachtbaren Verhaltensweisen des Morphogramms ***visible***, und die dahinterliegende Struktur ***hidden***.

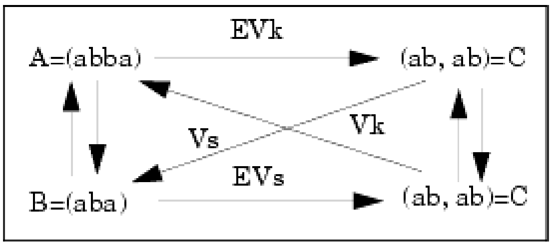
Die zwei Trito-Zahlen TZ**1**= (001212) mit der Subsystemfolge S**11222** und TZ**2** = (001012) mit der Subsystemfolge S**11112** sind nicht bisimilar, da die Wertung des 4. Zustandes in TZ**1** und in TZ**2** mit "2" bzw. "0" differieren.

1.4 Kenogrammatic decomposition and bisimulation

"Wenn sie in zwei gleiche Teile zerlegt werden können..." heisst, wenn ihre Verhaltenspattern sich nicht unterscheiden lassen, sind sie gleich. D.h., die Idee der Dekomposition eines Morphogramms in gleiche Monomorphien durch Abstraktion über verschiedenen Dekonstruktoren lässt sich als Bisimulation verstehen.

Es wird hier ein spezieller Zusammenhang zwischen der Struktur des Morphogramms und seines Verhaltens bei einer Dekomposition hergestellt.

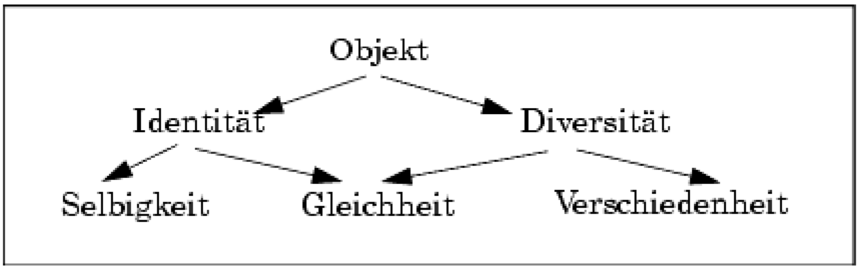
Diagramm 2



EVk * Vs = EVs * Vk

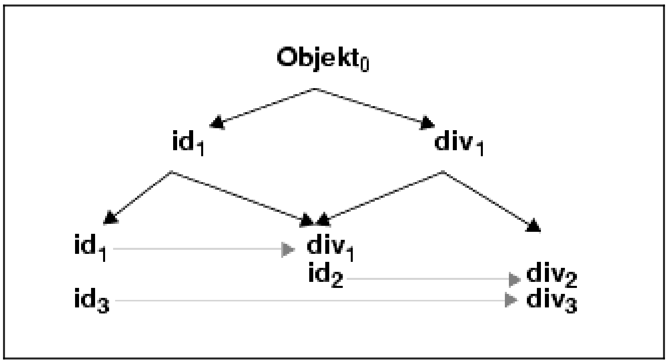
Different questions (EVk, EVs), equal answers (ab, ab)

Diagramm 3



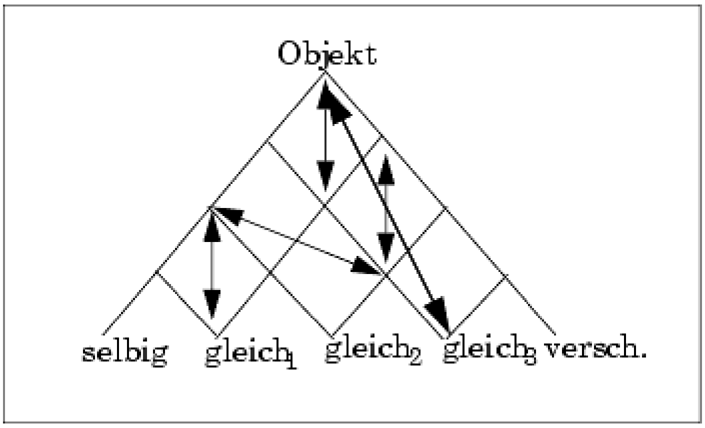
Modell von Selbigkeit-Gleichheit-Verschiedenheit

Diagramm 4



Identitäts-/Diversitäts-Relationen der Proto-Struktur

Diagramm 5



Unterschiede in der Gleichheit