Proposal for a paper to the First International Deleuze Conference

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Serialization, linearization, modelling

Abstract (April 2008)
Statements, according to Michel Foucault's conception in *The Archaeology of Knowledge*, are located in the space of the potential. They define the possibility of the emergence and of the differentiation of that which supplies meaning in the grammatical unit of a sentence, the truth value in the logical unit of a proposition, or the action in the pragmatic unit of a speech act. Foucault introduces statements as the "existential function" of signs, which raises the question of the categorical status of what he calls "fields of statements." In the here proposed paper I would like to relate this aspect of Foucault’s discursive materialism to the notion of the virtual in Gilles Deleuze’s transcendental empiricism which he develops in *The Logic of Sense* and in *Difference and Repetition*. The perspective I will develop departs from Deleuze’s and Foucault’s common interest in differential Calculus as a structural metaphor. This move allows to conceive of the two different modes of analysis, namely formalization and interpretation, as co-constitutive procedures. Such a reading has strong implications for the theory and the practice of modelling.

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Serialization, Linearization, Modelling

»The individual is not to be separated from a world, and yet: what do we call world?« (Gilles Deleuze)

»A statement exists outside of any possibility to reappear«
(Michel Foucault)

Prelude: act so that there is no use in a center

There is a saying by Gertrude Stein that has been troubling me for quite some time, because it involves a deep tension. Act so that there is no use in a center, she says in her piece of prose poetry entitled »Rooms«.⁴ In order to act (and not merely to behave habitually, routinely) there needs to be a focal point – so it seems at least intuitively. A stable point of reference, according to which we may orient ourselves. But this focal point, does it not subject us to its centrality, which irrevocably turns our actions into mechanical performance, mere functions that operate, overall, more or less well?

In the following, I would like to open up a five lines of thought which all at one place or another refer to this paradoxical indicative presented by Stein, the great acrobat of repetition. I am particularly concerned with the emerging culture of modeling.

1. Another Discourse for Philosophy: the Informal

Deleuze’s conception of the virtual has predominantly been theorized in terms of disintegration of rigid structures. Pierre Lévy tells us for example in his book Becoming Virtual that the virtual can be characterized by a strong tendency of deterritorialization, by a process of dissolution and multiplication, as a productive principle of disparity. Of course, it has also been criticized. Sam Weber said it would express a proliferating tendency, to perform even a devaluation, a development whose consequences, so we are told, promises to be devastating.²

For Deleuze, as we all know, the virtual is real. In his opinion, philosophy does not need to come up with a different, perhaps more complex, criterion for distinguishing between true and false. Instead, he argues, we have to take a structural look. As a philosopher of the 20th century, he is of course interested in the possibility of critique. But in fact, Deleuze’s
philosophy of the virtual is equally concerned with the conditions for integration as with that of differentiation.

What is at issue for him is nothing less than the possibility for philosophy to consider also the genetic make up of the Kantian program. He is interested not only in the transcendental conditions of reason, but also the genesis of these conditions. The discourse for philosophy that Deleuze attempts to open up with his conception of the virtual is »not that of the form, but also not the discourse of the formless: it is, rather, that of the purely informal«.

As a media theorist, I would like to develop an argument that concerns the emerging culture of a particular mode of modeling. For me it seems that in the most recent past, modeling began to mold into another game. Modeling turns more and more into investigations and excursions into realms which can well be encoded - yet not imagined.

Today, in many domains, ranging from architecture, design, and chemistry up to chip design and prospective data analysis, generic models are produced in simulated evolutionary processes in so-called rapid prototyping procedures. For such models, it is not always clear on what level they may count as an »individual«, for they may incorporate entire »populations« (if achieved by statistical means). As an assemblage, they integrate an open set of particular instances. Their components cannot be categorized in terms of resemblance in kind, they are not a copy of anything beyond the assemblage to which they belong. Rather, models are defined by their fictitious make-up, they are not thought to represent anything other than the potential to actualize. Despite being concrete in the sense that they may build the starting point for further abstraction, they are yet, in many ways, undetermined. In a very peculiar sense, these instances precede what they will eventually come to refer to. Or, to speak with Gilles Deleuze, the formalization of a position preceding that which will eventually actualize itself in that position – this is what he calls instances of the symbolic. They are neither representations nor do they have a proper content, in themselves they have neither form nor meaning. I would like to discuss in the following how the structuralist view proclaimed by Deleuze might lend itself to theorize this contemporary practice of »modelling«. It is characteristic for his structuralism, that the symbolic is not only the source of lively interpretation, but also – and this is indeed, for Deleuze, not to be separated from the former – a source of lively creation.
Manuel deLanda, John Bell, John Protevi and others have already argued that Deleuze's philosophy seems to be dispositioned to theorize scientific methods emerging from our dealings with what we call »complexity«. We categorize many of the phenomena observed in this context as »complex« because they no longer fall within the category of representations, neither »factual« nor »imaginary«. We commonly refer to the respectively observed phenomena in the context of digital simulation and visualization processes with somewhat mysterious labels such as »emergent pattern-formation« or »unpredictable systems-behavior« (which occurs even in a more or less semantic-free realm such as classical physics). From a theoretical point of view as we know it, such seemingly paradoxical phenomena of »unpredictable calculations« or »dispersed intelligence« appear to be »mere simulacrae«, or »illusionary appearances«. Despite the fact, that complexity is often just used as a synonym for a kind of transcendental ignorance, it can be given a precise meaning, both scientifically and philosophically. In "The Logic of sense", Deleuze attributes a differential relationship to the complex of the dark realm of bodies, the surface they constitute and the emergent dynamics of topological changes, marking thereby a paradoxical ontological shift.

Using simulated populations or simulated complex systems to calculate or explore certain effects or phenomena in science as well as in technology, we undoubtedly operate across the surface which sheds what we call the »real« from the »virtual«, with effects that do not unfold within any realm of the imaginary »as if« whatsoever. Simulation has come to be a method of scientific investigation, it has indeed advanced into an own mode of »knowledge production«. Where the two traditional forms of scientific knowledge, theory and experiment, fail, so the suggestion of technology theorists, simulated systems of differential equations are supposed to offer a third way.7

The crucial question posed by these new tools, however, regards their epistemological status: what legitimates them as an instrument for obtaining predictions? To quote just one voice of the respective discourse: „If they are not merely numerical solutions of theoretical problems, new practices of validation and assessment also become necessary.” Shortly spoken, simulations pretend to be formalistic, numerical operations, but they are not1. Thus, results must not be validated with other formal tools, they request, quite in contrast, for interpretations, for which – and that is the challenge – neither a metric nor a semantic space qua discourse exists.

It is not a surprise that Deleuze suggests a revaluation of the world for a philosophical discourse of the informal, involving a reconsideration of the mathematical tradition of calculus. The mathematical notion of the differential is central to Deleuzes thinking. Throughout the history of its development since the 17th century, it has undergone a
rather turbulent interpretation. Deleuze wants to foreground a certain notion of it that follows a lineage which has not been pursued by many mathematicians until today, and neither by many philosophers.

Just a rough sketch about the concept: Using calculus as a model by referring to the concept of the »differential« in order to consider the possibility of a non-representational logics (Logik d. Sinns) makes sense in at least two ways. First, as the symbolization of what Deleuze calls a »pure relation« – because strictly speaking, the differential refers to nothing. Both of the »values« between which the differential establishes its relation, are »smaller than any given or givable quantity«. Yet, to say that they equal zero would not be an accurate way to put it, for one value over the other, as a relation dy over dx, does not cancel out. The differential was imagined by Leibniz as an existing relation, infinitely small, which by its nature (i.e. definition) exists in continuing to vanish. Leibniz has defined it as an infinitesimal difference between consecutive values of a continuously diminishing quantity, he symbolized this relation as dy over dx (dy/dx). As such, the differential symbolizes a rupture that is immanent to any possible identification of a quantity as quantity. Rather, it is that which makes it possible for a quantity to be identified as such in the first place – this is what Deleuze calls »an element of pure quantitability«. (D&W, S. NN).

Ok, I will not attempt to draw even a brief sketch of the historical developments in the interpretation of this here. But I would like to elaborate a little bit on the problematic fields that are important in order to better understand the consequences Deleuzean philosophy seems to be motivated by. I will especially focus on some of the core concepts like »convergent« and »divergent series«, or »non-representability«. Furthermore I will outline some of the conceptual ties that bind his »program of the informal« to the contemporary media dispositive of »the digital«.

2. The Fall of Representations and the Dawn of the Diverging (Series)

The larger cultural relevance of calculus derives from its share in the rise of modern science since mid-17th century. Put very briefly, mathematical analysis has provided the symbolic means to start investigating the dynamic dimensions of things. i.e. their change. It rests on the belief that natural processes never change abruptly, or at once, discontinuously. Naturam non facit saltum, as Leibniz has formulated this ancient belief that goes back at least to Aristotle.⁸

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¹ due to the fact, that many simulations create information by their complexity (see deterministic chaos)
One can see in the calculus a manifestation of this idea: differential equations allow to integrate tracked changes within an observed system into a steadily developing and continuous larger movement, represented by a curve. Or on the other hand, if we know the symbolic representation of a curve (mapping a development), we can differentiate the formula and therefore make predictions about the behavior of the process at any specific point in time.

Yet just how to deal with this sort of continuity was problematic. Leibniz hypothesized the existence of a proper class of numbers called »infinitesimals« in order to provide an analytical foundation for his method of calculus. Newton chose another way. He avoided this move because by many people at that time, the postulation of the existence of infinitesimals was interpreted as re-introducing metaphysical assumptions into the backbones of the then emerging “modern science”. Newton rather founded his procedures traditionally, that is, on geometrical intuition. To make it short: Neither Leibniz’ solution with the infinitesimals nor Newton’s representationalistic geometric reasoning has survived until today.

However, the problematic status of this underlying assumption of continuity is not merely a question of style, for two reasons: Reason 1: infinite series of numbers cannot be treated in the same way, mathematically, as finite series can be. Reason 2: In order to be beneficial in the modeling of observed natural systems, these systems need to have a continuous trajectory, they need to be representable by an analytic mapping, which is formally integrable (and differentiable). However, there are many systems which are not integrable, even not piecewise, as Ilya Prigogine pointed out: For instance those systems which consist from several components interpreting each other, or many of those with higher orders in their formal representations, or those with an antipodic structure like reaction-diffusion-systems (Turing).

Back to reason 1, the crucial question with infinite series is whether they converge around a specific point – which makes their infinity a local infinity, so to speak. If this is the case, the summation of the two parts a series of fracture consists of will not exceed a determinable value. This means that for a series which may be infinite in the terms it may comprise, its actual value is not infinite. Such an infinity within limits, so to speak, can be identified mathematically by finding out the finite value the series orients itself to. Yet there are other series for which such a point cannot be determined, and they are, as a consequence, diverging.

The suddenly possible operation with infinite series in calculus eventually challenged a fundamental discussion and indeed gave rise in the mid-eighteenth century to a fierce dispute between Jean le Rond d’Alembert and Leonhard Euler. What began therewith as a dispute regarding the foundations and the limits of calculus came to be only a precursor of
the much larger crisis regarding the foundations of mathematics at large that flared-up around the turn to the 20th century. Complex numbers, defined as 2-dimensional numbers with a part which cannot exist as a geometric representation, are at the heart of this dispute. Euler invented a symbol, which is defined as the square root of a negative square, which of course cannot “exist”. Astonishingly, by use of another amazing number called e, it is possible to replace the pi (\(\pi\)) and the trigonometric functions. \(e^{i\pi}=0\)

Such calculations were, even in the mind of their inventor, Leonhard Euler, thought to be peculiarly unreal – but nevertheless, they were the necessary precondition to allow for the subsequent invention of electronic media. These analytical functions introduce an irreducible rupture between their operative symbolization and the actual development these functions are thought to represent. There is no way to render them intuitively accessible, that is, to find continuous representations for them. In semiological terms, this corresponds to a rupture between the symbolic signs of mathematics, the descriptive function or the signifiant, and their referent or object of analysis, the signifié, which is the world of physics. Quite unfortunately for the meso-cosmic everyday intuition, those quasi non-existing, purely symbolic indexes are indispensable for any device running on electrical power: everything from power stations to computers.\(^{10,11,12,13}\)

In the turn of these developments, a different habit of speaking became common, one which masked these underlying tensions. What used to be called »a function« in the early times of Leibniz and Newton came to be replaced by the concept of »mappings«. Rather than as describing a process in the world, the operations of analysis are now thought to refer merely to the mapping of symbols from one set into another set according to strictly defined transformation rules. This development finds its contemporary technological expression in the digitization performed by electronic media.\(^{14}\)

We can say that at last the latest foundational crisis has been provoked by this uncanny situation that formal analysis is operating with symbols that seem to lack a positively given reference. The crisis of modern formal science that Husserl, Bachelard and others have diagnosed around the turn of the last century originates in this peculiar arbitrariness that is characteristic to a certain type of analytical functions, which are, strictly speaking, non-representable.\(^{15,16,17}\)

When we return now to Gilles Deleuze and his interest in what he calls a philosophy of the differential, we can see more clearly where his approach - taking the differential as a scheme - seems to be motivated from. To be clear, with Deleuze the philosophy of the differential is not confined to positive sciences, and modeling is something which takes place in any moment we are thinking or speaking. For Deleuze, philosophy thus needs to reconsider what we mean by »the world«.
His new image of thought, as a way to conceive of thinking in non-representational terms, can be understood as the search for a philosophical stance vis-à-vis these developments. In this sense, Deleuze might even be called a »metaphysician« - yet one of medially, as we might perhaps say. The new discourse of philosophy Deleuze wishes to open up is not one of pre-modern formlessness, nor one of transcendental forms either. It is a discourse which involves what he calls a field of transcendence that is »informal«, a field of positively given singularities that can be immediately encountered. Yet as an object of experience, they need to become actual. This has a precise meaning for Deleuze: something actualizes itself by »continuing a series of ordinary points«. The full »sense« a singularity would be capable of unfolding would consist in the totality of all possible series it could continue. This means that the full sense can thereby not be exhausted, it must be said to persist throughout different actualizations. This is what Deleuze calls the object’s virtuality (or: its persisting singularity).

The genuine novelty Deleuze’s concepts introduces to philosophy at large is that in his thinking, divergence is no longer a principle of exclusion, disjunction is no longer a means for separation, the incompossible becomes itself, as a difference conceived in its elusive positivity, the very medium for processes of any sort, in other words for creative synthesis. It is in this sense that in his short addendum text to logics of sense on “simulacra and antique philosophy” he speaks of a necessary “Reversal of Platonism”.

3. From Linearization to Serialization: Deleuzes Method of Dramatization

To take part in the happenings of the world, thus, for Deleuze means to distribute oneself by continuing, what he calls, series of ordinary points. What seems to be either a strikingly biological way of speaking – to distribute oneself – or else a somewhat odd formal way of speaking – to align oneself within the conditions of an already established order (series of ordinary points), of course at once rises the question of »determinacy«. Does Deleuze thereby not tell us to either submit to some sort of structural or genetical »program«, namely that of reproduction?
As he accentuated so strongly, Deleuze understands his philosophy as literally, and that is meant in a very precise sense here, as symbolically creative. Thought, for him, is precisely what he wants to free from the limits of representation, and that is also, from its limiting understanding in terms of reproduction. What Deleuze has in mind is an empirical theory of concepts, that is, an empiricist reversal\(^\text{19}\) of Descartes rational methodology as well as of Kant’s Critique of Pure Reason.\(^\text{20}\) The philosophical question for Deleuze, from this stance, is not anymore that of how the world can be given to a subject (the question of recognition, or representation), but how the world, of which the subject is a part, is constituted within the world. Kant’s critical project was to provide a method that can account for the conditioning of reason, knowledge, and morality. Deleuze’s interest is to provide a method of genesis that can account not only for the conditioning, but also for the production of these.\(^\text{21}\) Following a certain post-Kantian tradition, Deleuze thereby takes a generic stance which must account also for the formation of subjectivity itself. Thus, the subject – for Kant the pole which produces empirical identities by active synthesis – is for Deleuze itself a result or product. The one question he sees steadily coming to the fore throughout the twentieth century is, in his own words from a short text about his friend Michel Foucault: How is the production of something new possible, from within the world?\(^\text{22}\)

Obviously, this question is strikingly at odds with the dominant scientific paradigm of the whole modern era, which developed from the mechanical and thermodynamic machines to logical positivism/empiricism. Both instances are well known to be completely unable to produce new things or to produce any statement about the new. Rather it is still an abundant taboo to speak about complexity and its creativity. Logical positivism and the accompanied quasi-science of statistics sanctifies linearization, splitting up the parts into the smallest parts based on the assumption, that all its aparts act as a mere sum, the interaction of those not adding anything more to the whole.

After his speech on The Method of Dramatization for the Société Française de Philosophie, Gilles Deleuze was asked to elaborate on how he can then, from within his peculiar mindset, account for the difference between the Natural and the Artificial. The question from his audience was motivated because Deleuzes’ suggestion of what he calls »dramatization« as a method for philosophy aims at allowing for a common theoretical framework, both for »things that are spontaneously dynamic« (natural) as well as »things that can be dynamized through self-regulation« (artificial), as Pierre-Maxime Schuhl had originally put it in his question.\(^\text{23}\) Deleuze attempts to answer how his »philosophical method« holds the promise of what he calls a »reversed platonism«, that is, a reversal rather than a conflation of this fundamental distinction. Such a reversal for Deleuze starts from an engagement with the very motivation for Plato to formulate this distinction in the first place. And this motivation he sees in the problem posed by what he calls the »will to selection«\(^\text{24}\), or, in other words: not in the specific criteria that allow for categorization but
in what precedes any such criteria, namely the telos of differenciation [im Zweck der Teilung], and with that, in the method of differentiation.

The way to distinguish an iconic clone from phantastic simulacrum in the platonic tradition takes the path via representation and objective reproduction. A common definition of the copy is by the presence of or absence of internal, essential relations of resemblance to a model. The simulacrum, on the other hand, bears only an external and deceptive resemblance to a putative model. In platonic terms, it is a copy of a copy whose relation to the model has become so attenuated that it can no longer properly be said to be a copy. A simulacrum stands on its own as a copy without a model. The platonic motivation thus wants to hinder simulacra from reproduction because of their troubling illegitimacy. Irreducibly, they incorporate a difference. As such, they lead a life of their own, and from a platonic perspective, they need to claim their positions in genealogical lineages they do not properly »belong«. The process of their production, their inner dynamism, is entirely different; their resemblance to any other instance is merely an appearance, a surface effect, an illusion.

It is that masked difference, not the manifest resemblance, that is natural to simulacra. A simulacrum has a different agenda than a copy, it enters different circuits by »continuing ordinary series« which they thus provoke to diverge. If Deleuze proclaims »dramatization« instead of »recognition« as a method for philosophy, he regards simulacra in a positivity of their own. For Deleuze, they are real entities, entities that are of a singular nature. Not resembling anything else, they are purely self referential. Deleuze method of dramatization means to reproduce simulacra, to qualify them into genealogical lineages and to organize their extension – as purely symbolical procedures. Those produce and are contained in what can be called serialization, since a series denotates an open sequence of which the genetic reason is not completely known. Serial processes can not be covered completely by any one set of rules, as it is possible for linear processes.

Doing philosophy means to mask their constitutive and elusive difference, and thereby establish an order into the undifferentiated set of the particulars a simulacrum is made up from. This order is structural. It merely demarcates symbolical positions, roles to be occupied by variable characters. Philosophical thinking according to Deleuze method sets the conditions for what our thoughts will eventually allow us to recognize. Operative on the structural level of the symbolic, it distinguishes between the ordinal position an instance may take within an ordered set and the cardinal value, which means the actual extension of that instance within a set. Dramatized thought travels through diverging series which form a networked structure of which we can only ever surf the surface.
4. Directions, Orientation and Dimensions

Thus, with what might be called Deleuze’s »critique of dramatizing reason«, the difficult thing is not to avoid deception with regard legitimate representatives, but to resist mentally inhabiting mere clichés, that is, within dramatizations of a simulacra that have been reproduced all too often (they thereby become the medium for oppression (his critique on psychoanalysis), this is why they need to be fluidized (not mobilized!)).

Not to accommodate within mere representations, within clichés, this is the new outlook for critique Deleuze opens up for philosophy. If we want to reflect on the genetic conditions of any particular order, we need to engage in a becoming which is different from that of realization. This becoming is different although it operates within the real, immanently, that is, differentially. Deleuze calls this procedure »counter-realization«. Yet this term is somewhat misleading, as he points out himself, because it is not in any sense a »contra-diction«, which would want to determine a true essence and retain its purity. Deleuze describes this procedure as a »vice-diction« instead, because it is tied to the problem of valuation rather than that of recognition. Philosophical thought is concerned with distinguishing the important and the not so important, the ordinary and the extraordinary, always according to the different capacities with which philosophy can formulate the problems at a specific moment in time. To have an idea, for Deleuze, means being able to formulate a problem differently, in a way that allows for a new perspective, for a revaluation of the world we live in. It is in this sense he can say that there is not a contradiction between structure and genesis, or between structure and event, and that the virtuality of ideas does have nothing to do with possibilities. The question that of course poses itself now is: how can we orient ourselves in thinking?

Deleuze sees the Orient, for popular as well as for classical philosophy, in the »heights« of platonic ideas: since Plato, thinking has come to be associated with an abstract movement of ascendance. If Deleuze asks for a re-orientation of philosophy, it is not in favor of countering this direction with its opposite, which would be an orientation towards »the underground«, towards »depth« - which for him is indeed a path that has already been explored by mystical thinking, as well as, in a critical form, by what Deleuze calls »the cynical way of reasoning«.

The philosophical dilemma involved here has traditionally been formulated in terms of »Who is speaking?«. Or in other words, it has been articulated as the question of legitimation for a philosopher for speaking up with regard to actual problems, and that is, in one way or another, about how to relate conceptual reasoning to empirical experience. Deleuze follows this tradition, although he opens the hitherto elementary building blocks of such a dialectics, namely the individual or person, as well as that of ideas, to further differentiation. Both components, for Deleuze, have a proper genetical make up. They
each have specific ways of coming into being, of individualization as he calls it. Thus Deleuze counters the two polarized models of thought, *ascendance* into the heights of abstraction, or *descendence* into the world of particulars, with his own model of *distribution* across different milieus. The aim of philosophy, in Deleuze’s terms, is not *to reach* the immediate, but to *determine* the place where *the immediate* maintains itself, as something that is present only in a paradoxical, that is *in a differential make-up*. This is the place he calls *the surface*. It is where simulacra produce their effects. With Deleuze, the main borderline for philosophy has shifted. It does not unfold between the rationalist distinction of the *universal and its instances* [das Universelle und das Besondere] anymore, nor between the empiricist distinction between *substances and their properties* [Substanzen und Akzidentien], but across the positivity of what he calls the *non-sense* of unordered appearances, that is, of self-referential sets or singularities (singularities which do not continue series of *ordinary* points).

Thus – the problem with clichés, for Deleuze, is not that they are too superficial, in lack of proper foundations. In fact, within his philosophy they are not superficial enough. The concept of *surface* for him is a realm autonomous from any designated *depth* or *height* to which it is oriented. The surface is the realm of the differential, dy over dx, the peculiar symbolization of that which lacks its representation (it has a zero value), but is nevertheless productive because of the pure relation it is constituted by. The surface effects it produces are where dramatizing reasoning takes place, a kind of thinking in the paradoxical sense that *sense* is immediately accessible and yet, it can never be *addressed* directly. That is, it cannot be *looked for* and *identified* in particular locations. The crucial next step now is to see how the determination of this *place* is possible for philosophy.

5. The Genetic Conditions of Reason: Networks

At the beginning, so we can summarize from Deleuze’s quest for the genetic conditions of reason, we find the symbolic as the order in which a structure manifests itself in the relational series that constitute the real. This new field of a transcendence, as outlined by Deleuze, can paradoxically only be characterized according to its surface-topology. *Structure* and *sense* mutually constitute each other – or, as Deleuze puts it, singularities and regularities symbolize together.

Reasoning means making sense of the world, Deleuze insists, and its genetic conditions ought to be looked for within the structural order of the symbolic. This, means, as he puts it by quoting Michel Foucault, *nothing more, but also nothing less, than the display [Entfaltung] of a space, in which it is finally possible to think*. The limits of thought, so we might continue this series, consist in the limits of the symbolic field that structures this
space. When Deleuze asks himself somewhat rhetorically whether there might be one structure which, as a final instance, determines all of the other structural instances, he classifies this question as «devoid of any sense» [sinnlos]. Within a logics of the differential, where the boundary for philosophy does not stretch between the original and the true or false copy, but between the simulacrum and the qualification of its appearances. Or, to put it differently, between the problematic idea and the actual formulation of the problem. As a topological space, there cannot be one metrics. «Resemblance» between virtual singularities and their actualization within a specific symbolical order must be put into quotation marks. «Resemblance» here, in fact, is a means, not an end. It allows for symbolical mappings from one set of singularities to another, according to specific transformation rules that set the dimensionality as well as the coordinates of the structure. To the world belongs everything that continues a series of points that follow an order, thus the statement in the outset of this paper. All structures are also infrastructures, so Deleuze concludes. If we take this way of speaking in terms of «infrastructure» seriously, we realize that the anarchistic element in Deleuze’s philosophy is just one component of its differential make up. The complementary component to the deterritorializing dynamics he has worked out is in fact the dynamics of encoding, of symbolization. This dynamics involves the establishment of new structures, and Deleuze uses a very precise, mathematical term for this: «stratification» is the name for the hierarchy of ordered sets in topological structures. Anything but independent of each other, the relations they entertain are external to any one of them in particular. As a whole which cannot be totalized, the different strata make up the integral structure of a network.

Coda: prospect onto a future relation between theory and synthesis

For something to be an infrastructure, we must be able to trust in its reliable functioning. Although we may all know better by now what it feels like to take part in networked cultures, we still seem to be uneasy about how to inhabit such structural displays. Although we may have many new technologies that are developed to support us, we lack the idea of how to use them in a reliable way. Theory, as the symbolical order that has been allowing us to anticipate better the course of events, has given way to mere modelling. And a model is defined by the absence, at least officially, as Isabelle Stengers writes, of any claim to evaluate or judge, that is, to make sense reasonably: For a single phenomenon, several models can exist without any problem, each defined by different variables, each having its zone of privileged validity or its specific advantages.

Models say themselves that they are fictitious, and that they should be treated as such. But they are more than mere fictions, for they dramatize the tales they narrate and thereby, they provide means of putting them to the test. Putting them to the test, however, cannot mean the elimination of its troubling rivals. Consistent with Deleuze’s...
reversal of the platonic distinction, putting something to the test serves the following and explicating of potential consequences. If the computer universe has established a direct relation between phenomenon and simulation, with nothing beyond simulation – that is, with simulations that precede what comes to occupy them - , then better anticipation can no longer be provided in terms of reduction. Contemporary infrastructures need to be able to deal with the proliferation of possibilities.

Thus what François Lyotard has »disguised« in his report on the postmodern condition as mere structural narratives appears yet in a different light before this background. In fact, if one considers Deleuze’s philosophy, things have become anything but arbitrary: Storytelling is now being taken up on the promise of complex contexts. The primitive functionalism of high modernity has only marked its coming advent: when »laws« become constraints whose effects have no interest apart from the circumstances that make up a local case, the mathematics that allows for the formalization of this case is simply one possible symbolical order. Such a »functionalism« can no longer justify its authority by making reference to the »primitives« [Stammfunktion] that are able to integrate a particular system of equations within an objective, that is, an unproblematic, symbolical order. Rather, it will have to create the proper genealogical lineage that will be acceptable for each case. And thereby, one aspect will be crucial: When spinning a tale into a design needs to satisfy the criteria of the structural engineers, their symbolical power needs to be of mathematical precision.
Notes

2. e.g. Samuel Weber, *Virtualität der Medien.*  
3. Deleuze's fundamental critique in *Difference and Repetition* is that throughout the history of philosophy, these conditions have always been considered as »already confined« in one way or another: Either within »a formless, entirely undifferentiated underground« or »abyss« even, or within the »highly personalized form« of an »autocratically individuated Being«.  
4. Deleuze, Logik des Sinns, S. 139  
5. Deleuze, Logik des Sinns, S. 141  
8. Leibniz called it *infinitesimal calculus*. Newton referred to it of *flux calculus*.
9. Much of the discussions throughout the 18th and 19th century around this new branch of mathematics dealt with this underlying notion of continuity. This notion became increasingly problematic, especially with the discovering of infinite series. With regard to the fact that analytical mathematics always responds to specific problems, the consequences of this new insecurity were indeed enormous: if natural processes were not to evolve continually, then there would be no ratio, and with this no reason, to belief in predictions about the course of specific events. And this is, after all, precisely what animates modern science – the possibility to improve anticipation. For better planning in the future, towards a comprehending management of the natural powers (like the intensification of forces into energy and its storage, for example; or the differentiation of money into credits and rates). The continuity of processes in Nature was the »guarantee« for a possible emancipation from fateful unpredictability.
10. The discussion was heated by the amazing possibility to build trigonometric functions (sin and cos), with the help of a new class of numbers (complex numbers involving Euler's number i, the square root of -1) that cannot be represented within the continuum of real numbers. This sort of analysis must thus be said to operate within a deterritorialized space – this expression we all know from Deleuze, deterritorialization, thus has a precise meaning and is borrowed from the respective mathematical discourse.
   In English: "It is a crack within the order of scripture anchored in the concept of representation which liberated the passage of the digital and opened up the space of technological media. Electrical media are based on what a representative of the classical Leibniz-Wolff analysis would have termed the 'non-analytical', that is the non-predictable, the non-representable, that which exceeds the limits of calculus. Modern analysis, that is analysis after Euler, is a deterriorialized one."
12. Such calculations were, even in the mind of their inventor, Leonhard Euler, thought to be peculiarly unreal – but nevertheless, they were the necessary precondition to allow for the subsequent invention of electronic media. These analytical functions introduce an irreducible rupture between their operative symbolization and the actual development these functions are thought to represent. There is no way to render them intuitively accessible, that is, to find
continuous representations for them. In semiological terms, this corresponds to a rupture between the symbolic signs of mathematics, the descriptive function or the signifiant, and their referent or object of analysis, the signifié, which is the world of physics.

13 Siegert, S. 211. “Der Riss erscheint vielmehr zunächst als Riss zwischen den Operationen und Symbolen der Mathematik und ihrem transcendentalen Signifikat, der Physik.”

The mathematical formalization of «information» by Claude Shannon in the late forties is just one step (although one of the crucial steps) in this development. And the great fascination of cybernetics to regulate entire processes by technological means, not only objectified processes as with the great machines of the industrial age, but also ongoing processes of multiply integrated circuits even, builds the dispositive of the digital that might perhaps be associated with todays information age.

15 The approach that has become predominant today is the finitist set-theoretical interpretation of differential calculus. The lineage which leads via Cauchy, Cantor and Hilbert has indeed initiated a discourse which will leave from the diverse concepts (involved in the original problem around continuity and the existence of infinitesimals, the concepts) it attempted to provide foundations for, »nothing more than dust«, Cantor dust, to be precise.

Siegert, S. 309ff.

17 As a scientific paradigm this great program of arithmetization gave rise to the schools of logical and empirical positivism in the early 20th century. Their goal can be seen in canceling out any remainings of interpretation, that is, arbitrariness, from scientific investigation. One of the crucial steps in this development was a reconsideration of the concept of »sign«, which in its symbolical form was now separated from its dimension of meaning when interpreted. Semiotically speaking, the ideal for science was to deal with purely formal symbols only – a tendency which has been countered immediately by the schools of phenomenology and hermeneutics, marking the beginning of what has since become famous as the Two Cultures, which have so aptly been characterized by C.P. Snow in 1959.

L&S, S. 216. „Die Divergenz ist nicht länger ein Ausschlussprinzip, die Disjunktion nicht länger ein Trennungsmittel, das Inkompossible ist nun ein Kommunikationsmitte.“ [my emphasis].

19 To which Deleuze is very much inspired by his reading of Hume, the first philosopher in his view who has been radical enough to think the exteriority, and thereby also the autonomy of relation.

20 A stance that owes in different ways to the Post-Kantian tradition of Salmon Maimon (critique on the „giveness“ of the Ding an sich), Edmund Husserl (transcendental logic of ideas, passive synthesis), or Ernst Cassirer (symbolical forms).

16 Siegert, S. 309ff.

21 He thereby follows the Post-Kantian movement, especially in the tradition of Salomon Maimon.


24 x = \{x\}, x equals the set of x.


26 The resemblance of the simulacrum is a means, not an end. A thing, write Deleuze and Guattari, »in order to become apparent, is forced to simulate structural states and to slip into states of forces that serve it as masks. . . . underneath the mask and by means of it, it already invests the terminal forms and the specific higher states whose integrity it will subsequently establish.«


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In this differential logics, “sense” is a paradoxical instance whose nature as a manifold structure it is to be *superfluous* and literally *uncountable*.

Compare Deleuze D&W, S. 241ff.

Compare Deleuze D&W, S. 243ff.


With reference to Gilbert Simondon, who developed a model of individuation which does not presuppose the existence of something like a *core* or *content* “individuum” - only to eventually undergo a process of *formation*.

One suggestion, which I will unfortunately not have the time to develop here, is that this surface my be further characterized as the symbolic, of the synthetic, which is primary to any: for it is the place where singularities of form and emptiness coexist, singularities which can well be *encoded* - yet not *imagined*, which can well be *differentiated and integrated* - yet without providing us the stable grounds the claim of a representation would establish via some sort of *evidence*, that is, as having an actual referent to which the model refers. Singularities are determinable, fully determinable, yet not without relating it to an order that is *specific* order that allows itself only for one possible formulation of the problem among infinitely of potentially possible other orders. These orders express themselves in series, made up of specific cardinalities (defines the quantitative extension of sets) and ordinalities (defines the position of a number in an ordered set).

As we might put it with reference to an often quoted statement by Deleuze concerning the abstract.


<<Now in topology, there is not one valid metrics. A topological order is not oriented in one way, according to distances – rather it allows to organize the space by what is called “qualitative criteria”. Topology is the mathematics of transforming singular bodies, which can be formally described by means of mapping them into ordered sets according to specified regulative transformation rules. In such a space that is pre-extensive, merely of ordinal, symbolical order - a space which Deleuze calls a pure spatium – the determinable positions precede what will come to occupy these places. And this sort of determination results in a theory of composition, which expresses how a certain determination functions. This can be understood in an almost too literal sense, as an exploration of what one can do, of how we can differentiate the world from within the integrity of a specific stance. The determination of the positions sets the rules of transformation for topological operations, that is, for the qualification of the singularities that realize themselves in these symbolical coordinates. >>

Ebd. S. 259.


Deleuze, Woran erkennt man den Strukturalismus, S. 277