The Struxture of Virtualization – Towards New “Potential Literacies”

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I would like to begin my talk with a quote from Ludger Hovestadt, the professor with whom I am working in Zurich. This quote represents well the attitude we identify with as a department doing research the field of Computer Aided Architectural Design.

"We are at the same time architects and information scientists, and as a species we are in a piquant situation. We know how to design systems of rules which in a second only are capable of populating our planet. We are also capable of designing rule systems which imitate built architectures close to perfection. Architects seem to take a smell at this and either recollect their own individual creativity, or try to turn to nature and the origin of things in order to legitimate what they are doing. They try to resist the run of technology onto their tradition as a form of art: back to nature. At the same time, the technical people keep on with their mobilization, blind to these resistances, and they are becoming ever faster, ever more differentiated in order to make it to the next level: everything is possible."

(Ludger Hovestadt, 2009)

I would first like to illustrate these claims with a few slides.

[...]

The initial question that is most intriguing for me as a media scientist then is especially in the context of new, possibly not yet recognized potential literacies: Why do we speak so much about media? Why are we doing so today, and why have we not done so 80 years ago, or 200 years ago? For which shiftings and tensions in
the tectonics of our culture could this be a symptom? And then, in the context of architecture, what might the respective change in the cultural setup mean for the practice of building surrounds?

1. **Introducing – the concept of the differential**

Differences are something which everybody learns about so early in childhood, that it appears to us nearly as a natural thing. And indeed, isn’t it a natural thing to calculate a difference, if even grey parrots or pigeons can do it? Or how can you on the other hand classify a golden retriever and a poodle as belonging to one and the same species? They just really do not look very much alike. As long as we don’t think about it too much, and treat habitual differences as a natural thing, it all appears simple to us, controllable, transparent and flat.

And yet today, we are capable of differentiating a lot. A whole lot more, that is, than just some hundred years ago for example – we have an enormous increase of new vocabulary from all the different scientific disciplines, the cultural backgrounds and habits that are meeting, et cetera. So the question of how to sort things out is becoming important again.

Human culture invented a purely formal tool to deal with differences, a tool which is definitely more powerful than a difference and its representation – but it is also more complicated. Perhaps you still remember the mathematical differential. Or you may think that you have long forgotten all about it, and that for your actual life, it doesn’t play an important role at all. Yet this estimation is based on certain assumptions that have become problematic. The Differential, with the derivative as one of its salient terms, provides a way to speak in a more formal manner about any given change that takes place. As such, it is long permeating our everyday lifes up into the most tiny filaments of its texture – before all, perhaps in relation to the comprehending economization of our affairs. Be it the concept of power rating, work over time or formally, dw/dt (dw over dt), be it the inflation rate, the relationship between market price and assets of stocks and shares or even the risk of options, which can be conceived of as something like the fourth derivative of value over time. Be sure, ordinary financial math does not stop here. Today, there seems to be no realm where we could escape from the operations of the differential, really. If Kant’s Critique of Reasoning concerning the reasoning by individuals marks one of the greatest achievements of philosophy so far, the
differential as perhaps the greatest achievement of mathematics does by no means stand back behind this.

Of course, there are certain problematic issues regarding the intersection of philosophical critique, mathematics, and everyday reasoning. Not only do differentials like $\frac{dx}{dt}$ (dx over dt), that is speed as the change of place, refer to something non-existent, strictly speaking, because the 0 divided through 0 is as such only virtually existent; but also other concepts mathematics operates with do not have any sort of intuitive representation anymore. Their intuitive evidence (Anschaulichkeit) is only a secondary one, which they acquire through their application, they lack any initial, that is intuitive accessibility concerning their invention. Complex numbers, which are two-dimensional numbers, or non-euclidean geometries may count as obvious examples of this. Not only are they indispensable for any technical development of the last 150 years. At the turn of the last century, they also played a crucial role in what came to be called by different labels such as *The Crisis of Foundation, The Crisis of Intuition*, or even *The Crisis of Modern Science* at large. This crisis, it seems, has not been overcome; there just seems to be something like a treaty to keep calm.

That may sound rather abstract and theoretical, but it is important to consider here that these mathematical concepts are in fact the very fundamentals for any engineer operating today, whether successfully or not, and this despite the lack of an established philosophical framework that could meet challenges these concepts pose for an adequate philosophical theory up to today. This is the situation in which, I think, the concept of the virtual and the discussions about it ought to be considered. And this is also the reason, why the lines of argumentation that I would now, in the following 40 minutes or so, like to propose to you, will not only make the impression of being fundamental. They indeed are. To draw a comparison to an architectural pattern, being much like basements necessary for the stability of skyscrapers, they are also buried deep into the ground.

I would like to start by asking you to imagine, that our protagonist – the Differential – had not yet entered our minds as a freely available, learnable concept, and did not yet make an appearance in our science nor in our diverse technologies as well as cultural techniques.
2. Back-Forwarding, or (re)starting with the 0

If time travel would be possible where would you fly to? It is always as interesting as challenging to imagine a world in which a particular concept or notion or insight has not yet been available. Yet this is, if not an impossible, then at least a somewhat odd situation to imagine, and I would like to start my talk with a short story that may serve as a point of reference in this regard.

The key figure from that story is the introduction of the cipher 0 into Western culture. This introduction, towards the end of the medieval ages, so a famous argument by Michel Foucault, has been a crucial move in the beginning reorganization of literally every state-of-affair towards the turn from Scolasticism to Renaissance. To give you only a few orientation marks: The changing situation involved the invention of the purgatory, that of the tyrannic bureaucracy of the church-state and their inquisition, as well as the invention of double accounting in economy. Along with that, it involved the concept of giving credit as the major driving force for merchandise, and as such also for the foundation of cities, as well as for the explorations overseas – for example by Amerigo Vespucci. It allowed, broadly speaking, to take risk in a way that previously had not been cultivated, a theme first dramatized by Shakespeare in the Merchant of Venice and later also in the Tempest.

Structurally speaking, it was the return from the Germanic to the Roman Law that was very important for all of this. In essence, it marked the transition from martial "politics" of life and death to the actual politics of a state – building on long-term dependencies rather than on instant gains.

Now, a few words only about the role of the cipher 0 in this: while the methods of feudal monarchs to levy their dues were directed at the goods at large in each particular situation, the methods of the states to raise inventory depended on the availability of standardized forms to do so. This standardization allowed for a comparison between the protocols – which opened up, of course, a very different power game that needed not be that of plundering anymore. Yet it is not so much the political side which shall be of interest here, but another, much less thought about side of this.

In a certain sense, the standardized tables also allowed for a different status of things: form now on, they could also be registered as missing. It was now possible
to count in the protocols what was not actually presented. All of this fostered a new potential to explore – that of negotiation and speculation, across the wide scale of expectations that could be raised, altered, reconsidered. *Risks could thus be taken by bits, partially, and thus became elementarized, prepared to be distributed.* They ceased to manifest themselves as a game of totalities. This allowed for the novel understanding of what it means “to know”, which characterizes the beginning of modern times – namely according to the measure of *standards.*

The role of the Zero is not only a strictly practical one. Let us consider one of the moves introduced by Descartes. His concept of the »origin« is upright a *Cartesian* *formidability*, since it formally symbolizes its Holiness itself, the origin of all according to the religious perspective. By attributing this role to the 0 in his abstract space of coordinates, Descartes managed to literally *operationalize* as well as *mobilize* that mystical situation from which everything is derived. His attempt to analytically provide foundations for geometry managed successfully to set free the concept of »origins« for shiftings around, and this was the precondition for the birth of experimental science at large. It eventually led to a mathematics of the infinitely small, namely calculus. With this new math, it was suddenly possible to derive specific processes from a larger frameset which needed only *to be postulated* in order to be tested; incredible freedom was thereby provided for scientists to do empirical research, in pragmatic as well as in political regards.

All these changes, so we might say, marked the beginning of European culture to follow the project of a curious Genesis which in an odd way seems to be referring back to itself. In the course of this, our culture has not only developed concepts of a positively given *nothing*, but also of *probability, of dynamics*, that of something as ungraspable as *information* and recently even of *media*. Based on those concepts, we can attribute sense to a whole range of phenomena, which appear new to us. Whenever we manage to play that *assignment game* successfully, i.e. when many people join in the language game and find it interesting, there is a whole range of phenomena to study and integrate what – previously – simply had not existed as such.

Bearing this in mind, we can say that it is not only the breathtaking simulations of digital technology today, which provide new experiences. Undeniably, so-called digital technology, mostly referring to the technologies based on encoding signals by a series of 0s and 1s, allows for breathtaking simulations, neither seen before nor necessarily referring to physical reality at all. Yet, this technology is even more remarkable for the new way of symbolizations it allows for.
Ever since *Signs* and Symbols are not viewed anymore as the traces or messages of God for us to meditate, concepts have become *effective* and have not merely been representations of a preexisting order, or “nature”, in mathematics as well as in hermeneutics. Novel symbolizations, as odd as they may appear at first for our intuition, in each case restructure the overall perspective which in its totality we have learned to call *The World*. And these perspectives, of course, they change over time – which is in itself a thought that became possible not before the beginning of the 18th century, when people started to develop a sense for historicity (Hegel 1770-1831) and evolutionary development (Darwin 1809–1882). Imagine just a world without the pervasive use of the concept of “development”, or that of “process”! It start to become manifest here that the concepts, i.e. ideas and words, always precede technology. The true constraints in the human world are words, as Wittgenstein pointed out as the first: The borders of my language are the borders of my world.

So, I hope I have been successful in demonstrating the issue, that imagining a world where certain concepts have not yet been available certainly is a fascinating thing to do. A secondary effect of such investigations is a certain plausibility, that the felt loss of orientation we perhaps all-too-readily associate today with media-effects may not be such a new and extraordinary phenomenon after all.

That little story about the zero, which actually concerns a major step in cultural development, opens thirdly a particular perspective to the phenomenon of generalized literacy beyond reading the word PISA. Namely, what is the relation of cultural dislocation qua change of conceptual space and media? Would the answer to *Why do we speak so much about media?* be found here, in this beginning new *symbolization of angels, of messengers from the beyond?*

### 3. Hypothesis: The struxture of the virtual

One of the hypotheses I am following in my work is that the concept of the virtual is closely related to that of mediality. But what is media and mediality all about?

What we today call “media” has in previous times been symbolized as either magical or holy. It refers to those channels which must be assumed to somehow be there previous to the existence of any particular message. This pre-existence has always been troubling, we can, after all, never really be sure whether the medium
transporting or storing a message has not influenced or even altered its original content. Marshall McLuhan, one of the first media theoretician, has drawn the consequences of this fairly early throughout the 20th century.

Quote: „The message of any medium or technology is the change in scale, time or scheme which it brings to the situation of man.”

Next to the main insight of McLuhan regarding the genuine capacity of media to have an impact or even transform our ways of interpretation, it is highly remarkable that he treats technology and media alike, here. With his formula for media to understand them as the embodiment of measure, or better: of measurability, a whole discourse about a so-called “strong concept of media” has been opened up. His own provocative statement in that regard is: The Medium is the message.

Since we can choose the medium with which to transport a message, this choice itself gains the status of a message. This is why media have definitely lost their modern ideal of neutrality. And this, in essence, means that the measures for “legitimate operations” of our perceptive as well as cognitive capacities have multiplied into a manifold.

This leads to a further hypothesis, which concerns the great ease with which we are inventing new symbolizations within the “Digital Culture”, as it is called. These symbolization processes are based to large extent on the technological means as well as the widely distributed respective cultural techniques, which can be seen as a direct result of compulsory education. It is worth to recall that it was widely introduced only some 100 (to 150) years ago. They are the very fruits of the praise of rigour and precision of enlightenment.

Viewed in this light, the disorientation that accompanies “Digital Culture” appears to be quite natural: Never before have there been so many people able to read, write, calculate. This also means that never before have there been so many voices proposing, debating and explaining the outcomes of their reasoning. Along with this, there is also a proliferation taking place of our means to formally register information: the novel technologies allow for indexing data without requiring for proper concepts that would allow us to understand how the indexes relate to each other. Actually, technical indexing can be created today almost completely automatically from any data. The most obvious fields where this can be felt today are perhaps climate research, pharmaceutics, and the financial systems. But much of these indexes are also made available to the public: Google earth for example.
offers in cooperation with numerous NGOs live updates of statistical data on for example Global Fisheries, Climate and Glaciers, CO2 (carbon dioxid) emissions in the USA, Influenza Seasonality, Unemployment, Solar Jobs Growth, the Worlds Population density, to name only a few.

All this data, even though it manifests itself as purely formal indexes, is the produces of various ways of mediating our perspectives. It is a bit as if there was the invention not only of the looking glass per se, but of a whole number of similarly groundbreaking magic-wands simultaneously and at once.

So the question really is, how are these “abstract objects” to be measured reasonably? And what is the meaning of measuring, in the empirical grounds of mediality, given the magics associated with it? There is a short way from the magics of mediality, the fact that everything in human culture is a media phenomenon, to the conclusion that the empirical analysis is pure schamanism, albeit on a considerably developed level. I see this question about the meaning of measurement, really, at the heart of what we have come to call “virtualization”: the virtual is that for which no “objective” measure can be assumed to exist.

But at the same time, what we see as being “virtually given” is not something purely formal and ideal either, because being the produces of more or less deeply integrated procedures that have rendered it available for us, valued choices are involved, for example on what to encode and what not, on what to regard as noise and what as signal – and this means, on a structural level they are not free of semantical content.

This poses extremely interesting issues from a media philosophic point of view. What is measurement, if its scale of reference has ceased to be that of our ability to relate to it by our intuition? I mean intuition here in a Kantian sense, as when he holds that “Concepts without percepts are empty, percepts without concepts are blind.” Intuition, for him, largely depends on the symmetry-relations of Euclidean geometry as well as on what could be a position for Critique in a post-Euclidean age?

Thus we have no conceptual toolbox to reflect what is “virtually given”, to theorize abstract data like this. Nevertheless we are inhabiting this digitally emerging phenomenality. Yet “inhabiting” would probably be too strong an expression yet, because the new “appearances” manifest themselves not by “naturally”, or “habitually” taking form anymore at all. This means that they manifest themselves
as indexes without a counterpart in the real, that is, – arguably – they are grounded neither on geometrical foundations nor on logical ones.

Thus, in terms of cultural techniques, we face a troubling unfamiliar situation here. The term itself, *cultural techniques*, is mainly associated with a “school” of research around the Hermann-von-Helmholtz-Zentrum für Kulturtechnik at the Humboldt University in Berlin, and especially with the German media scientist Friedrich Kittler. In general terms, cultural techniques represents an approach to suspend, at least partly, the question of the hermeneutic meaning(s) of texts or, more generally, content. The concept focuses on the impacts of media technologies on mental structures (including imagination) and cultural development, and tries to understand them by paying attention to what they call "the materiality of media". The very concept thus is vulnerable to help establishing another level of non-transcendable *immediacy*, often related to Jacques Lacan's peculiar interpretation of the concept of the Symbolic.

The troubling situation that processes of virtualization confronts us with, however, regards the insufficiency of either one of the two traditional paradigms to reflect cultural techniques. Neither that of *calculations* as well as that of *text* seem to be able to provide an adequate stance of how to evaluate them. In lack of an adequate term, I am referring to this troubling situation of the availability of marked indexes, registered and stored as abstract data and yet importing *valued decisions* on their structural level, as *The Struxture of Virtualization*. The distinction between structure (buried, not visible, pre-specific, active) and texture (surface, passive, specified) seem to be obsolete under regimes of virtualization.

But this all is really a forestalling of what I would now like to develop in greater detail, and in a few steps that build up on each other. First, it is now important to introduce the main contributor to such a philosophical perspective, Gilles Deleuze. After suggesting a few orientationmarks regarding the reception as well as a possible contextualization of his work, I would like to focus especially on one concept that is crucial to him: The philosophical concept of the Differential, and its relation to what Deleuze refers to as *The Virtual*.

**Gilles Deleuze**

The French philosopher Gilles Deleuze can be credited for making the virtual a contemporary concept. A *theory however*, that is, a framework of how to make that concept pragmatically useful, has still not been explored widely. His conception of
the virtual has predominantly been interpreted in terms of what may perhaps best be called a *wild* and *untamable* philosophy, a philosophy that resists any sort of *domestication*, of coming to terms with. The virtual has, in the rhetoric of many contemporary theorists, come to stand in as a symbol of disintegration of rigid structures. As such, it has mostly been stressed as a principle of disparity – either in a celebrating, affirmative way or quite opposite to this, as a destructive principle of decay of an entire culture of precise thinking.

Both of these stances, so I will argue, remain within the very frameset that Deleuze's philosophy aims to overcome. As a philosopher of the 20th century, he is of course interested in the possibility of critique. And yet, his philosophy is equally concerned with the conditions for integration as with that of differentiation. By strengthening the concept of the virtual as a primary category for philosophy – and this means, basically, as a third among the dualism of *true* and *false* – he asks us to take a structural look at how we can know about whether we actually do know something or not. In his peculiar adaptation of structuralism, he suggests for philosophy to not only ask about the *conditions*, but also about the *genetic make up* of the Kantian program. Thus, he neither introduces a new criterion for distinguishing between true and false, nor does he hold that in certain cases, the very aim of this distinction may not be adequate.

As such, Deleuze's philosophy opens up not only the possibility for what some have called “noography”, which in its conception is similar to that of cultural techniques. Instead, I will try to argue that implied in his approach, there is also the possibility for the *synthesis of the very infrastructures that accommodate thought*. I see in Deleuze's philosophy a prolegomena to a novel architectonics, an architectonics in the element of mediality. This underlying theme of my talk I will call *noosynthesis*, or the creation of the conditions of artificial mindful states to emerge, as well as the creation of the “infrastructures” that allow these constraints to persist over time. This is where I see contemporary architecture coming into play, with their explorations both in terms of so-called “free-forms” as well as with the rather recent conflation between surface and structure, which so many contemporary architects are exploring. I hope we can return to this in our discussion afterwards, I hope.

For a structural perspective, so Deleuze tells us, it is crucial to introduce a third order between that of the imaginary and that of real. Quite in terms with other structuralist thinkers like Lévy-Strauss, Lacan, or Michel Serres, he refers to this
order as the symbolical. Within the symbolical order, what has traditionally been referred to as form and content is being reversed in a very peculiar way: logical places are identified and marked before something actually comes to actualize itself in them. One can see in this the very principle of formal languages in informatics. Neither form nor content, a symbolism precedes what it is eventually going to refer to. Using simulated populations or simulated complex systems to calculate or explore certain effects or phenomena, we undoubtedly operate across the surface which sheds what we call the »real« from the »virtual«. The discourse for philosophy that Deleuze attempts to open up with his conception of the virtual is, quote: \textit{not that of the form, but also not the discourse of the formless: it is, rather, that of the purely informal}.$^{(1)}$

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.$^{(2)}$

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, then new practices of validation and assessment also become necessary.“ Shortly spoken, simulations pretend to be formalistic, numerical operations, but they are not1. Thus, results cannot be validated merely 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 yet.

This is where the \textit{Figure of the Differential}, and its proposed status as that of an emerging new cultural technique playing on the level of mediality, gain their relevance from.

\footnote{due to the fact, that many simulations create information by their complexity (see deterministic chaos)}

Ever since Descartes freed our thinking from coming to terms with eternal substantial categories, measuring is tightly related to a logics of grids. Descartes did so by replacing eternity by coordinates. We have already considered that the operationalization of the 0 can be interpreted as the mobilization of the concept of “origin”, thereby giving way for a new culture of experimentation. Modern science was to a large degree driven by developing systematical experiments to find out about whether a supposed “origin and ancestry” of an observed phenomenon proves to be a justified supposition alias “cause and effect”. This is what “a legitimate statement”, at the same time metaphorically and literally, really meant.

This entire culture was only possible due to a new focus on “processes” rather than on “states” alias “the essence of things”. The introduction of abstract space literally evolved into an emancipation from the ancient notion of space as substance, as well as of its Christian variation during medieval times. Abstract spaces are so abundant today, that we only rarely think about them anymore. They are present in the form of spreadsheets and statistics, in management as well as in sociology or genetics. And as is the implicit problem with each habit, there might be better ways of doing the same. In case of abstract spaces, we currently learn about such other ways by what we now call networks, or “complex” or “associative geometries”. Abstract spaces today are not to be exclusively conceived as Cartesian, that is orthogonally oriented spaces.

Philosophically speaking, the introduction of abstract space by Descarted marked a shift from an ontology of substances to one of relations – it was due to focusing on relations that processes could be studied systematically. The sufficiently sophisticated operational means that allowed for this was Newton’s and Leibniz’ invention of Calculus, some 50 years after the introduction of the formal grid alias the system of Coordinates.

The larger cultural relevance of calculus, as I have argued, 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.
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. Leibniz even had 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 the postulation of the existence of infinitesimals was interpreted as re-introducing metaphysical assumptions into the backbones of modern science. Newton rather founded his procedures on geometrical intuition. To make it short: Neither the infinitesimals nor the representationalistic geometric reasoning survived.

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 of numbers, and their usage for Calculus. 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.

The problematic status of this underlying assumption of continuity is thus 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. Actually, infinity as a mathematical concept has been introduced to mark entities which cannot be measured, so one should really not expect to be able to treat them in the same way as the measurable numbers. 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, not even piecewise, as Ilya Prigogine pointed out: this concerns
growth processes of living organisms, the weather, and if we allow for the analogy
between density relations and heat, also social situations like traffic jams et cetera.

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 even though a series is infinite in
the terms it may comprise, its actual value is not infinite and can be determined.
 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
can not 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 can not exist. Astonishingly, by use of two other amazing number called
e, and pi (p), it is possible to replace the trigonometric functions. Quite
unfortunately for the meso-cosmic everyday intuition, those quasi non-existing,
purely symbolic indexes are indispensable for any engineering concerned with
electrical power: everything from power stations to computers.\textsuperscript{3,4,5} 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
\textit{them}.

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 – as well as in the numerous and somewhat helpless discussions about the possibility to distinguish analog media (analog = structurally continuous) from digital media (digital = structurally discontinuous).

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.

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. His new image of thought, as a way to conceive of thinking in a productive way, and yet within non-representational terms, can be understood as the search for a philosophical stance vis-à-vis these developments.

5. Weaving our own genealogies: from linearization to serialization

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 have the status of "immediacy" – but that can nevertheless be encountered. He calls this paradoxical stance that of a "transcendental empiricism".

Yet as an entity of encounter, the singularities need to become actual. And this "becoming actual" of singularities has a precise meaning for Deleuze, derived from his structural analogy to the mathematics of the differential: for a singularity to actualizes itself it needs to »continue 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 *singularities’ virtuality* (or: its *persisting* singularity). Given this assumption, Deleuze’s method for philosophy proposes to decide whether an appearance, an actualization, is “legitimate” or “illegitimate” not by trying to reconstruct its “true” ancestry, but by aiming at integrating them into “genealogical” lineages by qualifying them to be integrable into a *phantasized* history. Qualifying them to be integrable means, by organizing their extension in a legitimate way – as purely symbolical procedures. Those produce and are contained in what can be called *serialization*. Due to their orientation within a phantasized history, they differ genuinely from what the engineering sciences for example call *linearization*. A series denotes an open sequence of which the generic makeup is not completely known. Serial processes cannot be covered completely by any one set of rules, as it is possible for linear processes.

Thus 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. 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.

When Gilles Deleuze was asked to elaborate on how he can, from within his peculiar mindset, account for the difference between the Natural and the *Artificial*, he attempted to answer how his »philosophical method« holds the promise of what he calls a »reversed platonism«. By that he truly means a reversal rather than a conflation of Platos fundamental distinction between the Ideal and the Real. 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«, or, in other words: which appearances are to be trusted? It is important to recall here, that Platon was actually confronted within a cultural context that bears at least certain similarities to ours today: with the at that time rather recent invention of the phonetical alphabet, it had become possible to transcribe speech and make it available after
the moment of its utterance. In oral traditions, people who had something to say were conceived as having inspirations, literally of being the medium of speech for some transcendental source. The possibility of literally transmitting these moments changed the status of witnessing fundamentally – Platon was fighting the sophists! Those who had developed rhetorical skills in troubling people with their claims, like the famous case of Zeno and his paradoxa. The proclamation of a proper realm of ideality had the very basic need to come up with a new dimension, people could objectively refer to in order to legitimize their proclamations. For Deleuze now, when he aims at a reversal of platonisms, he is not proposing an adequet and specific criteria that would allow for categorization, but a way of symbolizing what precedes any such criteria, namely the telos of differenciation [im Zweck der Teilung. So his concern really is with the philosophical framework from which an adequate method of how to differentiate can be derived.

So there is in fact a structural similarity between Platon situation against the sophists, and ours here for us today, namely the question of how the Models gained by means of computational simulations may be evaluated in a justifiable way. It is not per chance that philosophers of science like Isabelle Stengers today speak of a new specis of scientists as The New Sophists.

The assumption we take from Deleuze, then, is that models are to be ascribed the status of virtuality – because of their peculiar way to precede what they will once come to represent – and that the problematic about this status is the question of measurement: if they precede what they will eventually come to mean, also no metrics can be assumed to preexist their meaning. Measuring becomes an issue which can no longer be regarded as independent of the goals we pursue. In order to measure, here, we need to say what we want to find out by measuring.

In a philosophical way to put it, this manifests the radical suggestion to naturalize transcendence. This suggestion finds its counterpart in the rather recent tendency of viewing everything not as organized in grid-structures (and all the implications that go along with that: objectivity, control etc.), but as part of networked-structures (and all the implications that go along with that: ambiguity, performativity, co-dependence, etc).
6. The Genetic Conditions of Reason: Networks

Thus, in what might be called Deleuze’s »critique of dramatizing reason«, the difficult thing is not to avoid deception with regard legitimate representatives. The difficult thing is to resist mentally inhabiting mere clichés, that is, within dramatizations of a simulacra that have been reproduced all too often. The new outlook for critique Deleuze opens up for philosophy is then not to accommodate within mere representations, within clichés. 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« (vice = bad habit, schlechte angewohnheit) 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 that 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. We call possibilities what can already be imagined beforehand – and this is a limiting concept, as I have tried to show with the stories involving the introduction of the cipher 0 at the beginning of this talk. The question that in some way poses itself now – as it was for Platon, indeed - 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 Deleuzes 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 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, effective, because of the pure relation it is constituted by. Here, »structure« and »sense« mutually constitute each other – or, as Deleuze puts it, singularities and regularities symbolize together.

Within a logics of the differential, 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 an idea and the actual formulation of its 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, becomes a means, not an end.
The »nature« of »resemblance« is that of a postulate, and as such, it is operative. It is a medium. 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.

All structures, then, 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 Deleuzes 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«. »Stratification« is the name for the heterarchy 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.

The problem with the cultural techniques that are available for us so far – those that are intuitively familiarity for us – is the differentiated verticality of networks that makes them full of potentiality. By potentiality I mean that there is no strictly speaking logically necessary path they follow in their development; rather, there are at each instance a multitude of possible next steps. In order to find orientation here, the concept of *noo-graphy*, as a way of trying to represent how we reason is not sufficient anymore. I would suggest we start to speak of *noo-synthesis*, for any symbolization of what we call reasoning bears impacts on what will unfold. Thinking and deciding within the element of potentiality cannot conceive of itself as representational. It takes place in a performative way.

Ok, here I am at the end my introduction to you into the philosophy of Gilles Deleuze. I would now like to establish a bridge from these heavy thoughts back to architecture, by showing how not only the theoretical but also the pragmatic notion of infrastructure is currently changing – changing from the element of possibility into that of potentiality, and how these changes are related to the integration of information technologies. I have prepared some slides to illustrate this.

[.....]
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.

Originally in German: [„Es ist der Riss einer im Denken der Repräsentation verwurzelten Ordnung der Schrift, der die Passage des Digitalen freisetzt und den Raum der technischen Medien eröffnet. Die elektrischen Medien basieren auf dem, was ein Vertreter der klassischen Leibniz-Wolffschen Analysis das „Nichtanalytische” genannt hätte, das Nichtberechenbare, Nichtdarstellbare, die Grenzen des Kalküls Überschreitende. Das moderne Analytische, das heisst die Analysis seit Euler, ist ein deterritorialisierter Analytisches.”]

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 deterritorialized one."

5 Siegert, S. 211. „Der Riss erscheint vielmehr zunächst als Riss zwischen den Operationen und Symbolen der Mathematik und ihrem transzendentalen Signifikat, der Physik.”