

MODULATION AFTER CONTROL

Yuk Hui

The model of the triode is the functional analogy [*analogue fonctionnel*] of a social structure.

Gilbert Simondon

Abstract This article revisits the concept of modulation in Gilles Deleuze's *Postscript on Control Societies*, in which he announces control societies as the new paradigm succeeding Michel Foucault's disciplinary society. Deleuze characterises this shift in terms of a shift from 'moulding' to 'modulation', namely from a form-imposing mode to a self-regulating mode. The concept of modulation is crucial to Deleuze's reinterpretation of the history of philosophy, where he employs it to turn against, for example, Aristotle's hylomorphism and Kant's transcendental categories. The role of modulation in Deleuze's thought in general, and in the article on control societies in particular, reveals an *aporia* concerning the consistency of this concept: isn't the idea of control societies a realisation of Deleuze's philosophy? On the other hand it urges us to consider how modulation is realised through digital technologies, which occupy a central role in his article on control societies, and are further taken up by contemporary media theorists such as Alexander Galloway and Antoinette Rouvroy. This article attempts to address these two questions by looking again at the work of Gilbert Simondon, whose concept of modulation was an inspiration to Deleuze. For Simondon, the concept of modulation is closely related to technology, a dimension not sufficiently explored by Deleuze. By exploring Simondon's 1961 paper 'Amplification in the Process of Information', this article elaborates on the concept of modulation, in relation to technical amplification and individuation. It attempts to show that how modulation can also be understood as a way to resist the tendency of 'disindividuation' in control societies, and that the 'modulative' mode of control societies is only one possible outcome from the philosophical concept of modulation. It concludes with a concrete practical example from within the development of alternative social networks.

Keywords Modulation, Individuation, Disindividuation, Amplification, Deleuze, Simondon, Social Networks

MODULATION IN DELEUZE'S CONTROL SOCIETIES

In his article *Postscript on control societies* (1990), the philosopher Gilles Deleuze continued the analysis of Michel Foucault on the passage from the society of

sovereignty to the disciplinary society in the nineteenth century, and showed that we have arrived at what he calls ‘control societies’.¹ The passage from the society of sovereignty to disciplinary society is characterised by the shift from direct commands (e.g. to tax, to rule on death) to a disciplinary mode of production (e.g. prisons, factories, or other enclosures of space). In control societies, Deleuze proposes, we can observe a new form of operation that is no longer about the enclosure of space. To be more precise, it is no longer a control that explicitly and directly imposes its violence or force on individuals; and nor does it archive their obedience according to its institutional and social code, as we can see in the example of prisons. Rather, this new type of control is characterised by creating a *space* for the individual, as if he or she has the freedom to tangle and to create, while their production as well their ends follow the logic of intangible forces. If we understand the first form of control - direct intervention - as moulding [*moulage*], then this second form of control can be understood in terms of *modulation*. In Deleuze’s own words: ‘enclosures are moulds, distinct mouldings, but controls are modulations, like an auto-deforming mould that would continuously change from one moment to the other’.² The term modulation is central to Deleuze’s analysis of control societies and it will also be the point of departure of this article, in order to articulate its significance in contemporary culture.

Deleuze’s description of modulation can clearly be understood in terms of changing labour conditions: under Taylorism, workers worked according to strict codes and followed well-defined instructions in the factory; towards the 1980s, a new mode of control began to appear, which the French sociologist Philippe Zarifian calls a ‘control by modulation’, which ‘gave the worker a certain freedom to manage his time, displacement and a good number of his actions’.³ Deleuze made another comparison between disciplinary society and control societies in terms of the analogical and the numerical. Retrospectively, the word *numérique*, has a double meaning according to the common translations of this word today: firstly *numerical*, as number for management; secondly *digital*, which is closely related to the digital networked technologies used for management and surveillance, recently amplified due to the Snowden affair. These two aspects make Deleuze’s *Postscript on control societies* a significant reference point for understanding the transformation of modes of control as well as governmentality that have occurred since its publication.

The question that this essay is concerned with is: if ‘modulation’ is central to the concept of control societies, then what exactly is modulation, and how does it operate?

THE ORIGIN OF MODULATION AND THE APORIA

However, the concept of modulation needs to be further complicated, in order to fully understand its relations to control societies. In fact the concept

1. Gilles Deleuze, ‘Postscript on Control Societies’, *October*, Vol. 59 (Winter 1992), pp3-7.

2. *Ibid*, translation modified.

3. Pierre Pastor and Richard Bréard, *Motiver*, Editions Liaisons, Paris, 2005, p94.

4. As well as the works that this article refers to, a non-exhaustive list of writing on modulation in other works of Deleuze can be found as follows: in *Logique du Sens*, Édition de Minuit 1969, p107, Deleuze talks about Artaud and the modulation of language, a language without articulation; in *Cinéma 1: l'image-mouvement*, Éditions de Minuit 1983, p39, he talks about photography as 'moulage' and cinema as 'modulation'; in the collection *Deux Régimes de Fous*, Éditions de Minuit 2003, pp345-357, he comments on the style of Georges-Louis Leclerc de Buffon as modulation of language: 'c'est plus qu'un moule, c'est une modulation, c'est-à-dire un moulage à action interne et transformation temporelle'.

5. See Gilles Deleuze, *Difference and Repetition*, translated by Paul Patton, Athlone Press, London 1994, chapter 4.

6. Gilles Deleuze, *A Thousand Plateaus*, translated by Brian Massumi. University of Minnesota Press, Minneapolis, p408.

7. A thesis completed in 1958, two parts of the thesis were published separately, the complete volume was only published in 2005

of modulation also plays a decisive role in Deleuze's thinking in general, and it serves as a fundamental concept that allows Deleuze to re-interpret the history of philosophy. If we take a close look, the term 'modulation' appears in many places throughout the works of Deleuze.⁴ It is highly possible that Deleuze adopted this concept directly from his contemporary, the French philosopher of technology Gilbert Simondon (1924-1989), who until recently was barely known to English-speaking readers. In his earlier work - *Difference and Repetition* (1968), for example - Deleuze refers to Simondon's concept of modulation, opposing an idea of experience as the modulation of the sensible to Kant's subordination of the sensible to intuitions and categories.⁵ In *A Thousand Plateaus* (1980), Deleuze again refers to Simondon's concept of modulation, and his critique of 'hylomorphism';⁶ in his book on Leibniz *Le Pli: Leibniz et le Baroque* (1981), Deleuze simply quotes Simondon to explain what he (Deleuze) means by modulation.

The concept of modulation was introduced by Simondon in his principle thesis *L'individuation à la lumière des notions de forme et d'information* (*Individuation Considered in the Light of the Notions of Form and Information*) in order to resist the idea of moulding, which has been central to Western ideas of the relationship between form and materiality at least since Aristotle.⁷ Moulding is the paradigmatic example of what Simondon calls 'hylomorphism'. Hylomorphism is his name for the theory of matter and form first posited by Aristotle. This model understands being in terms of form and matter, conceived as absolutely distinct categories, from which we can derive the essence of any entity's being: an object of such and such a form [*morph*] and consisting of such and such matter [*hyle*] is what an entity is. Simondon understands hylomorphism as an obstacle that prevents thinking about the nature of becoming; worse still, hylomorphism opposes being and becoming, for becoming - a processual condition of ongoing immanent transformation - destroys individuality when the latter is considered only in terms of a relationship between form and matter. Concerning the *Metaphysics* of Aristotle, Simondon wrote 'becoming remains conceived as movement, and movement as imperfection'.⁸ Instead, Simondon proposed, 'becoming should not be opposed to being; it is a constitutive relation of being as individual' (*ibid*).

Consider the moulding of a brick: we can intuitively understand that it is the result of applying a form, concretised as the mould, to matter, namely the clay. Simondon contests this hylomorphic intuition, however, and proposes to understand this process as operative, meaning that it is best understood as the communication of information between different parts of the mould, the sand, the moisture, and so on, modulated by the hands of the craftsman, and later the heating process in the oven that produces the brick. In this example, we can see that hylomorphism is a simple but powerful reduction, while modulation derives from a different ontology of matter, which we may call a philosophy of genesis, as opposed to the philosophy of hylomorphism. The philosopher Anne Sauvagnargues also sees this as the foundation of

Simondonian and Deleuzian transcendental empiricism: 'the analysis of modulation consists in substituting the abstract confrontation of matter and form with a new analysis of form, understood as intensive variation of forces and materials, as information, that supposes that the existence of a system in metastable equilibrium can be individuated'.⁹ If we can say that hylomorphism operates dialectically (form + matter = synthesis), then modulation operates in terms of *disparation* [disparity], a word used by Simondon to describe internal tensions within any given being.

Modulation for Deleuze serves as a form of resistance, not only against moulding or cohesive forces, but also against a certain history of philosophy (e.g. the Aristotelian - Kantian tradition). The concept of modulation also resonates with other key Deleuzian concepts such as the rhizome, smooth space, plane, etc. However, it is interesting to note that in the later works such as the 'Postscript on Control Societies', the concept of modulation becomes the paradigm of capitalistic production, or more precisely the operation of power in control societies. We may therefore wonder whether it isn't exactly through the development of this key concept of 'modulation' that Deleuze himself becomes the philosopher of control societies? This *aporia* is the central question that the rest of this essay will attempt to resolve; its aim is ultimately not only to trace the genealogy of the concept of modulation, but also to re-read Deleuze's 'control society' thesis in the light of this concept of modulation. Instead of saying that modulation characterises control societies, I seek here to analyse control societies as specific modes of modulation, that produce a homogeneous individuation or even a *disindividuation*. Before drawing any such conclusion, however, we need to look very closely into the particular potency of this concept, and its own developmental trajectory, with a special focus on its relation to the digital. Hence the article proposes to: (1) elucidate Deleuze's concept of modulation; (2) trace the concept of modulation in Simondon's technological thought; (3) clarify its relevance to our contemporary technological culture; and (4) discuss the possibility of re-appropriating the concept of modulation in light of the question of control.

DELEUZE'S CONCEPT OF MODULATION

In the opening sentence of *The Fold* - a book dedicated to Leibniz and the Baroque - Deleuze writes, 'The Baroque refers not to an essence but rather to an operative function, to a trait'.¹⁰ The relation between matter and soul doesn't work in the same way as matter and form, but rather in terms of an operation: folding. His project in regard to Leibniz is, in hindsight, to understand folding as a form of modulation that distances itself clearly from classical hylomorphism. Deleuze introduced the concept *objectile* to characterise this new ontology, referring to objects which are no longer conceived in essentialist terms:

8. Gilbert Simondon, *L'individuation à la lumière des notions de forme et d'information*, Editions Jérôme Millon, Paris 2005, p91. Hereafter *ILFI*.

9. Anne Souvignargues, 'Simondon et la construction de l'empirisme transcendantal', in *Cahiers Simondon*, vol. 4, p11.

10. Deleuze, *The Fold*, Athlone Press 1993, p3.

The new status of the object no longer refers its condition to a spatial mould - in other words, to a relation of form-matter - but to a temporal modulation that implies as much the beginnings of a continuous variation of matter as a continuous development of form. In modulation 'a pause never intervenes for withdrawal from the mould because the circulation of the source of energy amounts to a permanent withdrawal; a modulator is a continuous temporal mould' ... Moulding amounts to modulating in a definitive way; modulation is what Leibniz is defining when he states that the law of series posits curves as 'the trace of the same line' in a continuous movement, continually touched by the curve of their convergence. His is not only a temporal but also a qualitative conception of the object, to the extent that sounds and colours are flexible and taken in modulation.¹¹

11. Ibid, p21.

In the idea of moulding we encounter an essentialist conception of the object conceived in terms of a rigid distinction between form and matter; in modulation, the mannerist concept of the object understands becoming as an event in which certain immanent properties of matter are expressed.¹² Hence, to truly understand an object, it is necessary to adopt a non-hylomorphic metaphysical perspective. This new metaphysics finds its analogy in modulation. In his course on painting in 1981, Deleuze showed how this analogy can be further used to understand painting. This time, Deleuze starts with a technical understanding of the term 'modulation' by giving his students the example of television. Waves are modulated in terms of amplitude and frequency to carry signals, which upon their arrival at the receiver are demodulated into discrete impulses, which can be reassembled to give moving images on the screen. Deleuze derived three results from this understanding of modulation: (1) there is a passage from moulding to modulation which one should distinguish; (2) all code is in fact a 'grafting' of code onto an analogue flux, meaning that analogue is the background to the digital; (3) the analogue, in its most strict sense or in an aesthetic sense, can be precisely defined by modulation.¹³ The discussion on modulation aims to redefine painting neither as modelling nor as moulding, but as modulation of colour and/or light. Deleuze further mapped the elements of painting with the elements of signal processing:

12. Ibid.

13. Deleuze, La peinture cours, 18 May 1981: http://www2.univ-paris8.fr/deleuze/article.php3?id_article=198.

Painting	Modulation
Canvas	Surface/background
Light or colour	Wave
Space	Signal

Figure 1

Painting, according to Deleuze, in its complete sense is: 'modulating light or colour or, light and colour for a signal space'. Deleuze uses Cézanne as an

example to demonstrate modulation in painting, since Cézanne's painting is the modulation of colour; according to Deleuze: 'Cézanne invents a new regime of colour that invokes the concept of modulation'.¹⁴ Yet Deleuze noticed that the above comparison is still lacking something, which is what it wants to produce. In painting, modulation gives its final product as figures - a resemblance more profound than photographic resemblance.¹⁵ By bringing Simondon and Leibniz together, Deleuze went beyond their descriptive scope, and constructed an ontological understanding, which includes not only technical objects (Simondon) or curves (Leibniz), but also all kind of objects as well as subjects. His discussion of painting further demonstrated the profundity of his modulative thinking, which cannot be reduced to a simple opposition between moulding and modulation, but rather implies a totally new ontological ground for understanding being as modulated becoming. Later Deleuze deploys this metaphysical framework to understand the nature not only of all living and technical beings, but also of capitalism itself. It is very interesting to observe that a similar analytical move takes place in the *Postscript on control societies*:

14. Ibid.

15. Ibid.

There is no longer a capitalism for production but for the product, which is to say, for being sold or marketed. Thus it is essentially dispersive, and the factory has given way to the corporation. The family, the school, the army, the factory are no longer the distinct analogical spaces that converge towards an owner - state or private power - but coded figures - deformable and transformable - of a single corporation that now has only stockholders. Even art has left the spaces of enclosure in order to enter into the open circuits of the bank.¹⁶

16. Deleuze, 'Postscript on Control Societies', p6.

It is not difficult to see that, here, firstly, modulation is not necessarily digital, but can also be present in analogical forms; secondly, the vocabulary used by Deleuze to describe his ontology is transposed to his analysis of capitalism: coded figure, deformable, transformable, etc. Conceptually one opposes modulation and moulding; in reality, modulation and moulding co-exist, and consists of a hybrid mode, which Simondon calls *modelage*. In Deleuze's analysis, contemporary societies move more and more towards the mechanism of modulation, consequently distancing themselves from the mechanism of moulding. My investigation into modulation here is in part an attempt to recover this concept of modulation by re-contextualising it within the field of possibilities opened up by contemporary digital culture. In order to do this, I propose to return to Simondon. It is not that Simondon has a more authentic understanding of modulation than Deleuze, but rather that Simondon has a closer relation to the question of technology, and hence one can find in Simondon's thought a concrete modulation-control correlation; while at the same time, one can also find a modulation-individuation correlation. A comparison of Deleuze and Simondon will enable us to elucidate the questions

that we have set up here, and hence shed some light on the *aporia* in Deleuze's use of the concept of modulation that we pointed to earlier.

SIMONDON'S CONCEPT OF MODULATION

In the previous section, we briefly discussed Simondon's concept of modulation in contesting classical hylomorphism. For Simondon it is necessary to understand beings in terms of relations instead of substance. We can understand modulation as a constant becoming according to certain measures and constraints. Once being is understood in terms of relations, then being can be imagined as an amplification in which different relations are modulated according to respective causes and effects. This ontogenetic understanding of being opens the way not only for a new metaphysics, but also a new politics that proposes new models of organisation based on feedback, namely cybernetics. We can find the concept of modulative amplification (along with transductive amplification and organising amplification) in a talk by Simondon titled 'Amplification in the process of information', given at the conference *Colloque de Royaumont* in 1961. The talk was followed by an exchange between Simondon, cybernetic pioneer Norbert Wiener and physicist Donald MacCrimmon MacKay. Simondon opened the discussion by defining information not as entity but as operation:

Being or not being information doesn't depend only on the internal characters of a structure; information is not a thing, but the operation of a thing arriving in a system and producing in it a transformation. Information cannot be defined outside of this act or this transforming incidence, and the operation of reception (*italics original*).¹⁷

17. Simondon, 'L'individuation dans les processus d'information', p159.

Before we discuss this peculiar cybernetic argument, which is rather unusual in Simondon's work, we need to pay attention to the word 'amplification'. As well as referring to a signal being amplified, in the ordinary sense, it also refers to a phase-change in the process of individuation. Simondon understands being as a process of individuation, wherein each individual always has the potential to individuate itself. But 'individuation' is always understood as an incomplete and inherently relational process, and for Simondon is also always understood as an operation of information, which makes it fundamentally different from a moulding of matter-form. It is also crucial to understand that, for Simondon, 'individuation' is understood as a process which can be collective, personal, social and psychic; for example, a nation or a city, insofar as either has any degree of sociological, psychic or political coherence or functionality, is a product of partially successful processes of individuation.

Now let's have a closer look at the different types of amplification that Simondon outlined in his talk. Transductive amplification could be exemplified by the process of crystallisation, in which the propagation

of information is 'transductive', meaning that it is robust and multiple, involving a transfer of information from one phase-state to another. As a model of information-exchange, transduction has to be distinguished from classical logic, which is based on step by step inference of propositions. In the crystallisation of a supersaturated solution, for example, once the nuclei are formed they release energy that triggers the crystallisation of the surrounding solution and propagates until the solution becomes metastable. For Simondon, a social metaphor would be the spread of rumours, which does not follow a linear propagation, and relies upon the affective potency of the rumours and their implications more than any rational cognitive logic.

The second type of amplification effect, the modulative - named after modulation - has a more specific meaning here, and is our central focus. Simondon gives the example of a triode to explain the effect of modulative amplification. The triode is the basic form of electronic amplifier that powered electronic devices prior to the invention of microchips (which are still based on its principles). The glass valves which powered mid-twentieth century radios, TVs and stereo amplifiers were all based on this model. A triode works by adding a positive-feedback control to a diode. In a diode, there is a cathode with a negative charge, and another with positive charge. The cathode is heated to emit electrons, the positive charge of the anode attracts electrons towards it, and a current is produced. The triode puts a grid between the anode and cathode: a small potential charge applied to the grid can greatly amplify the current. The grid between the anode and the triode effectively modulates the current. In *ILFI* Simondon asks how it might be possible to conceptualise the triode in terms of the matter / form binary. We could posit that 'matter' is the electron cloud, and 'form' is the modulation produced by the potential difference between the cathode and the grid.¹⁸ But this is clearly an inadequate formulation, because the modulative, properties of the triode are inherent to its amplifying function, which is not one of mere signal exchange or transduction.

18. Simondon, *ILFI*, p47.

The modulative effect of the triode enabled key discoveries in electronics, and also to the dispute between the inventor of the triode and another important contributor to the radio electronics of the twentieth century, Edwin H. Armstrong. Armstrong discovered that the triode can actually be used as a frequency generator: when an audio signal is applied to the grid, it can be amplified in the circuit. This basic discovery leads to further inventions of regenerative feedback circuit, as well as the well-known FM (frequency modulation) used in radio systems, which Deleuze discussed in his lectures. With the concept of *relay* (e.g. the employment of a smaller voltage difference (e.g. the grid) to trigger a larger voltage difference (between the anode and the cathode), Simondon claims that 'the model of the triode is the functional analogy of a social structure' (*ibid*). We can imagine the social group as a unity, in which the sub-ensembles have a common polarisation constituted by norms, for example moral norms. The polarisation allows the group to be

amplified by certain determined information or patterns of conduct, just as that of the anode and the cathode is effectively modulated by a grid (p169).

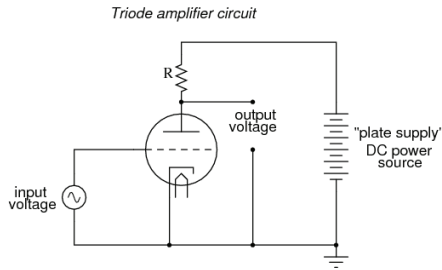


Figure 2

The third model of amplification, or amplification at the highest level, is organising amplification, which is the synthesis of both transductive amplification and modulative amplification. The

difference between it and modulative amplification is that it is more about *auto-regulation* (p168). Simondon gives the example of the perception of retinal images. The right eye and the left eye receive two different images, which are incompatible. Organising amplification is the resolution of the incompatibility, giving a final single image as the synthesis of the two. Simondon writes: ‘transduction, modulation, organization are the three levels of amplification of information process, through positive input [*recrutement*], limitation, and the discovery of a system of compatibility.’¹⁹

Simondon did not publish this paper in the proceedings of the conference, instead opting to publish the abstract, and the discussion between him and Wiener and MacKay was reduced to two lines. This article was found almost fifty years later, among his posthumous publications. This exposition of Simondon’s concept of modulation adds two points to Deleuze’s conceptual analysis: firstly a technical dimension that offers a different understanding of ‘control’ from merely equating it with the practice of surveillance; secondly the relation of amplification to modulation, which opens up space for speculation. Simondon was very conscious of the fact that these schemes of amplification could be transposed onto social domains (ibid). In pursuing this last point, we might further characterise these three modes of amplification, in terms of (1) crowd effect - e.g. crowd sourcing or crowd funding - characterized by transductive speed; (2) the repetition of behavioural patterns, or of particular units of information, which act as a *relay* to create more significant effects (e.g. marketing); (3) the *self-regulation* of social systems, for example the self-regulation of local neighbourhoods. In general, these modes of amplification all tend to facilitate auto-regulation and energetic efficiency (using one small amount to trigger a larger amount). Simondon’s analogical method (from technical to social) is not simply metaphor; indeed it would be wrong to see the relation between the technical and the social as purely analogical; instead, it is what Simondon calls ‘allagmatic’. The word *allagma* in Greek means change or exchange (synallagma is the bringing of two parties together under a contract, from the Greek *Synallagmatikos* that in turn comes from *symallattein* which means to bring together, to unify).²⁰

We can see that the concept of modulation has its origin in technology, but

19. Simondon, 'L'Individuation dans les processus d'information', p173.

20. Jakub Zdebik, Allagmatic. *The Semiotic Review of Books*, Volume 17.2 2007.

it is not a purely technological concept. In both Simondon's and Deleuze's concepts of modulation, we can discover at the same time two implications: firstly, an ontological interpretation of being which distances itself from ancient metaphysics; secondly, a new way of understanding relations between humans and the world. For his part, Heidegger makes a similar move by criticising hylomorphism as the beginning of the forgetting of Being, since it favours the knowledge of beings [*Seiendes*]. The metaphysical turn that Heidegger proposes is the return to the question of Being [*Seinsfrage*], which effectively produces anew mode of being-in-the-world. Deleuze and Simondon turn to a metaphysics of modulation against moulding, and emphasise the political implications brought by this new understanding.

The nature of this new understanding still requires further clarification, however. It is not that Deleuze and Simondon have discovered a new mode of control, but rather that the metaphysics they have developed renders a particular social and political transformation visible. By the same token, this metaphysical interpretation does not merely emerge from the history of philosophy itself; it is also influenced by the discovery of quantum mechanics and its application in electronics. The application of such technics and devices in telecommunications then produces an epistemological shift in our understanding of modes of control. The substitution of hylomorphism based on moulding with a theory of information and intensity based on modulation, renders visible a social and political reality of our time: the emergence of new patterns of regulation and governance which Deleuze ultimately names with his concept of 'control societies'. Through the concept of modulation, Simondon develops a new theory of individuation of physical, living and psychosocial beings, while Deleuze understands the shift from moulding to modulation in relation to a social, economic and political transformation, which he terms control societies. In the next section we will see how modulation is used as technique of social control in the era of digital technologies, and finally we will come back to resituating this technical concept of modulation in a broader perspective.

SOCIAL MODULATION AFTER DIGITALISATION

Continuing our discussion of the application of concepts of modulation in social and technical domains, we can now consider some analysis from contemporary media scholars who have been inspired by Deleuze. These analyses serve in particular to illustrate the concepts of self-regulation and relay, which both derive from modulative thinking. In particular we can note here that the concept of modulation seems to carry the promise of a 'free' subject which is nonetheless correlated to modes of control. Due to the lack of rigid regulations (which would equate with moulding), the subject conceived in terms of modulation and modulatory processes seems to have the freedom to act, even if such freedom is already anticipated by regulatory systems, and

21. David Savat, 'Deleuze's Objectile: From Discipline to Modulation', *Deleuze and New Technology*, Edinburgh University Press 2005, p47.

22. Alexander Galloway, *Protocol: How Control Exists after Decentralization*, MIT Press 2006, p11.

the free acts themselves are modulated in such a way that they take on a self-regulatory character. David Savat, a researcher on Deleuze and technology, in his article 'Deleuze's Objectile: From Discipline to Modulation', claims that 'discipline and modulation could be seen to behave similarly, in that both can function through one and the same database or profile, while simultaneously producing entirely different effects'.²¹ This assertion seems to demonstrate a certain ignorance of the history of philosophy and the trajectory of Deleuze's thought, even though Savat also quotes Deleuze's book on Leibniz, since, as we have already seen above, the shift from moulding to modulation doesn't imply such a 'similarity', because the two are fundamentally different in terms of metaphysical meaning and political implications. Nonetheless Savat makes some interesting observations concerning technological modulations under contemporary conditions. He summarises three mechanisms of modulation: (1) the recognition of patterns; (2) the anticipation of activities; (3) the responsibility of individuals for the organisation of working time. The first two mechanisms clearly correlate with key processes of regulatory control that we have already discussed, and the third mechanism refers back to Zarafian's observations, cited at the beginning of this essay, to the effect that giving individual workers the freedom to organise their time may be more 'productive' (whether in terms of strict efficiency or of profitability) than following a strictly defined division of time, as in the classical Fordist/Taylorist model.

Alexander Galloway, in his book *Protocol: How Control Exists after Decentralisation*, has successfully shown how this logic of control (the third mentioned by Savat) was implemented in the protocols of computer networks, and in turn is transposed to the wider social field. Galloway compares the three models of network proposed by the RAND scientist Paul Baran (namely centralised network, decentralised network and distributed network (see Figure 2)) and recognises that '... the distributed network is an entirely different matter. Distributed networks are *native to Deleuze's control societies* [italics added]'.²² Galloway suggests that the distributed network fully demonstrates the logic of Deleuze's control societies. In a distributed network, transmission is not guaranteed, data is transmitted in the form of packets that contain a header and the content. These packets are passed from one local router to another (local means that none of them have full knowledge of all connections), and are reassembled upon their arrival.

This mechanism is known as 'best-effort', meaning a process without guarantee. We can see that these seemingly rule-less infrastructures constitute an effective system of control, which is neither centralised nor decentralised, but rather distributed.

Paul Baran's three models of networks (1964)

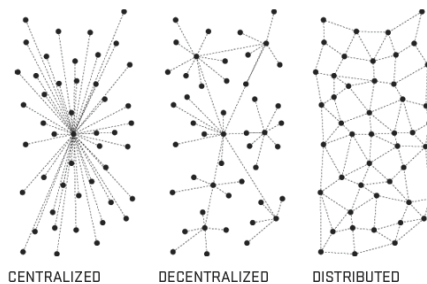


Figure 3

Following on from Galloway's analysis, the Foucauldian legal scholar Antoinette Rouvroy goes deeper into the subject and proposes that the neoliberal mode of governmentality, as described by Foucault, Deleuze and Galloway, has been already overtaken by what she calls *algorithmic governmentality*. The logic of modulation does not only operate through infrastructures such as networks, but is rather embedded in all types of apparatus (for the purpose of data collection, recommendation, restriction). This means that as digitisation has pervaded into different institutions (be they local or international enterprises, government or non-governmental organisations) it has made the operation of algorithm central to any form of governance. Like Savat, Rouvroy acknowledges the use of mechanisms such as pattern recognition and anticipation of user activities as fundamental to such operations, and identifies them all as elements of what she calls 'data behaviourism'. Data behaviourism, advanced by technologies of data-collection and processing - now often referred to as 'big data' or 'machine learning' - has re-oriented neoliberal governmentality into an algorithmic process. All patterns of behaviour are monitored and registered as information that can be used to trigger social interactions on a larger scale.

For Rouvroy, the use of algorithms in governance no longer produces subjectification, which means that the subject, instead of being conceived as a type of mini-enterprise, or defined by its income (as Foucault described the neoliberal subject in the *Birth of Biopolitics*²³) instead enters into a process of de-subjectification, where the subject is fragmented and can no longer maintain a coherent identity. Rouvroy's understanding of this modulation process is in fact closer to Simondon's than Deleuze's. That is to say, she assumes that human existence is modulated in such a way that it can be amplified and controlled, producing a significant effect when it is demodulated, meaning that these modulations lead to actions in everyday life. Rouvroy writes:

Algorithmic government thus contrasts with what we know about a neoliberal mode of government which produces the subjects it needs. Through the ubiquitous injunction - and its internalisation by subjects - of maximisation of performance (production) and enjoyment (consumption), neoliberalism produces 'hyper-subjects' having, as their normative horizon, the continuously reiterated project of 'becoming themselves', and passionately engaged in 'self-control', 'self-entrepreneurship' and 'self-evaluation'.²⁴

In such a modulative process, however, each individual is finally divided into what Deleuze calls the '*dividual*'. Rouvroy observes that this form of governmentality does not address the subject, but rather the infra-individual (which are numerised relations) and the supra-individual (meaning the profile automatically constructed by machines through pattern analysis). We can probably also understand this in terms of what is called *disindividuation*,

23. Michel Foucault, *The Birth of Biopolitics*, Palgrave Macmillan, New York 2008, p224.

24. Antoinette Rouvroy, 'The end(s) of critique: Data behaviourism versus due process', in *Privacy, Due Process and the Computational Turn. Philosophers of Law Meet Philosophers of Technology*, Mireille Hildebrandt & Ekatarina De Vries (eds.), Routledge 2012, p153.

25. See Bernard Stiegler, 'The Disaffected Individual in the Process of Psychic Disindividuation': www.arsindustrialis.org/disaffected-individual-process-psychic-and-collective-disindividuation.

meaning that the individual has lost its capacity to individuate both psychically and collectively. We need to specify here the use of this term 'disindividuation' in the works of Simondon and Stiegler respectively. For Simondon, disindividuation is one of the phase of individuation, in which the preceding structure dissolves in favour of a new one (hence it is neutral and necessary); for Stiegler, disindividuation implies an inability to individuate both psychically and individually due to the destruction and dissolution of desire (hence it is a destructive phenomenon, or in his terms, a short-circuiting of desire).²⁵ Consumer society, for Stiegler effectuates a psychic and collective disindividuation, consequently transforming individuals into mere buying-power, and the 'we' to the 'they'. For Antoinette Rouvroy, this disindividuation has a destructive effect, in that the *potentiality-possibility* of the subject is replaced by the *actuality-probability* of algorithmic operations. For example, online marketing effectively uses user information and data to propose recommendations and decisions, which the user can take for granted. Rouvroy sees the disastrous effect of algorithmic governmentality as being that the subject loses the possibility to doubt what is given and to develop his or her own judgment. This type of modulation is also destructive of groups, since it only creates groups according to their behaviours. Living beings have the capacity to modify themselves and create norms, while in the algorithmic modulation, norms are created by objective data.

Despite the nuances of their observations and interpretations of control societies, each of these writers examines a consistent modulative logic that expresses itself in different ways: auto-regulation; or exploitation of behavioural patterns, in particular their use as relays in order to modulate events on multiple scales. It is also important to notice that the *numérique* becomes the central theme of this mode of control. It is not possible here to respond to all the issues raised by our discussion of modulation, but I would like to conclude by contrasting again the two understandings of modulation and its significance that we have discussed: on the one hand, the understanding of modulation as a technological mechanism whose constitutive processes are analogous to emergent models of social control; on the other hand, the theory of ontogenesis based on the idea of modulation, which understand the latter as the principle of being *qua* becoming. The former understanding addresses hyper-control in current capitalism; the latter proposes a new conception of being and acting. Hence in order to advance a critique of modulation, we need to address both of these questions and the relationships between them. We should also bear in mind that the latter cannot be exhausted by the former, but can be realised through the former in different ways. That is to say, metaphysical thinking offers more opportunities to develop new types of modulations that may in fact facilitate rather than inhibit processes of individuation, of democratic group-formation, or of collective engagement. It is in this spirit that I want finally to examine the possibility of appropriating the concept of modulation beyond the limits

of its deployment by social technologies of control.

MODULATION AS RECONSTRUCTION OF THE SOCIAL

To re-appropriate the concept of modulation is, on the one hand, to acknowledge and deepen its philosophical significance as a materialist alternative to hylomorphism, and, on the other hand, to imagine new modes of modulation that don't simply fall into the logic that Deleuze and others have described in terms of 'control'. What we would absolutely want to avoid would be implicitly to propose a return to hylomorphism as a mode of resistance to social control modulation. Nor would it be appropriate to let go of the concept of modulation, with all of its philosophical usefulness (particularly as deployed by Simondon), simply because of Deleuze's polemical characterisation of modulation as a key feature of control societies. Instead, it is the final aim of this essay to suggest exploring the concept of modulation under the motif 'modulation after control', getting beyond the limits of what we might call 'the modulation-control correlation'.

From the theoretical principles laid down by Deleuze and Simondon, as well as the examples of contemporary technologies, we can derive two observations. The first is that modulatory processes of social control operate through a particular set of mechanisms which seek to understand and select social relations according to specific orders of magnitude, for example: inter-individual relations, individual-group relations, group-group relations, which can then be represented by corresponding technical apparatuses, or more precisely by corresponding data structures. The way in which such processes divide and classify such orders of magnitude reflects the basic assumptions on which their technical implementations are based. For example, with online recommender systems, what is understood as fundamental is individual-group relations, since they are fundamental to the logics of social 'contagion', group-formation, identification and cultural influence that are central to mechanisms of marketing and promotion. Secondly systems of self-regulation which operate through modulation are always characterised by some teleological end, whether it be profit-making, the promotion of internal competition between group members, the preservation of the social group, etc. This teleological end is inscribed in the algorithms, which recursively modulate the social relations with precisely defined orders of magnitude and attempt to move the system toward ever-greater efficiency. Or more precisely, they promote a kind of frictionless collective and personal individuation - in which there is no tension experienced between different modes, sites and scales of individuation - by producing logical effects which recur at various social scales. For example, one-click shopping on Amazon based on recommendations, or the 'like' button of Facebook as a symbolic form of participation, are precisely mechanisms which seek to replicate particular types of personal interaction in coded forms and at ascending social scales.

By contrast, Simondon's concept of individuation is by no means frictionless, but rather full of tensions. This is perhaps what distinguishes Simondon and Deleuze's take on modulation and individuation. Where Simondon writes about 'tension' in a system or a process, in seemingly negative terms, Deleuze refers to the far more positive-sounding 'intensities'. For Simondon, individuation is a process through which emergent tensions are partially and temporarily resolved as a system achieves a state of 'metastability'. In any example of process, we can also observe a transformation of the structure of the objects involved. An example that Simondon often gives to illustrate individuation is crystallisation. In a supersaturated solution, the 'tensions' emerging between ions have to be resolved; hence new structures are formed. At the same time heat is released during the formation of new bonds, and information (in the form of tension) is spread further to other parts of the liquid. This is also applicable to the individuation of psychic beings, in which the conflicts within the individual (for example, anxiety, boredom, dread) and the tensions between the individual and the collective (e.g. competition, guilt, shame, etc) are the guiding forces of individuation as such. The key point here is that Simondon's concept of individuation necessarily involves relations between multiple orders of magnitude. At the same time it is not necessarily defined by a teleological end, but rather it moves towards an undetermined end driven by the tendency to resolve tensions and incompatibilities, as Simondon illustrated with his discussion of the concept of organising amplification. This brief description of individuation doesn't do justice to Simondon's comprehensive theory, but is merely intended to posit a correlation between modulation and individuation, which both subsumes any correlation between modulation and control and at the same time goes far beyond its limitations in understanding the implications of the concept of modulation.

The *aporia* that we set up at the beginning of this article, namely that between the role of modulation in Deleuze's thinking in general and the specific function of modulation in Deleuze's conceptualisation of control societies, can also be resolved by moving from modulation=control to modulation=individuation. At the same time, this move opens up a political-analytic task for the theory of modulation. For if modulation is identified with control societies today, then the task for those who wish to find ways to supersede existing forms of social control will be to invent new forms of modulation that are not limited to them or by them. The current understanding of 'modulation after control', which we have encountered in the analyses of Galloway and Rouvroy, is one that lacks any understanding of tensions and incompatibilities as inherent to processes of personal and collective individuation, since the only modulatory process that it can imagine is one motivated by the cybernetic goal of maximum efficiency. The question now is: how can the profound concept of modulation in Deleuze and Simondon's thought (e.g. its intention to re-found a metaphysics), and

the analytical tools that they developed around this concept, be helpful in thinking through this political objective and its implication? I would like to offer a brief example to demonstrate how this could be thought through in terms of technological development, and I would like to use this example to conclude this article by showing how retrieving the concept of modulation can offer us some insights into more creative and positive means of reconstituting the social through technical means, which would themselves constitute a technical means of realising the philosophical critique of hylomorphism and its legacies.

A project that I worked on with Bernard Stiegler and Harry Halpin from the World Wide Web Consortium, starting in 2012, aimed to develop a new concept of the social in order to develop an alternative social network to Facebook.²⁶ We started with a study of the particular way of materialising social relations on which Facebook is based, which can be traced back to the method of sociometry, developed by the American social psychologist Jacob L. Moreno. Moreno was one of the first sociologists to demonstrate the value of graph-theoretical approaches to social relationships. The most-often quoted example is his work at the New York State Training School for Girls in Hudson, where the runaway rate of the girls was fourteen times higher than the norm. Moreno identified this as being a consequence of the particular network of social relationships amongst the girls in the school, which he followed by creating a simple sociological survey to help him 'map the network'. The survey was based on simple questions such as 'who do you want to sit next to?'. Moreno found from the map that the allocation plan of the girls in different dormitories created conflicts; he then used the same model to propose another allocation plan that successfully reduced the number of runaways. His belief in the value of representing social relations by 'charting' them prompted Moreno to write that, 'as the pattern of the social universe is not visible to us, it is made visible through charting. Therefore the sociometric chart is the more useful the more accurately and realistically it portrays the relations discovered.'²⁷

These relations are materialised as lines and numbers on a map. We may also observe that in Moreno's methodology, every individual was considered a social atom; the society represented on this basis is a network composed of social atoms linked together by numerical relations. Here we see a clear instance of neglect of the question of the ground, as forms are taken for totality. Individualism is promoted through technological networks. In 1933, when Moreno published in the *New York Times* an article titled 'Emotion Mapped', he suggested drawing a sociometric map of New York City: in fact he was only able to produce such a representation for a community of 435 people, yet nowadays, with tools such as Facebook, Moreno's dream is no longer impossible.²⁸ Social networking websites like Facebook stay within the sociometric paradigm by materialising social relations in terms of digital objects, and allowing new associations based on different discovery algorithms

26. The project ran for a year. We studied alternatives such as Lorea, Crabgrass, Diaspora, and, based on the existing infrastructure of Crabgrass, we developed a prototype: <http://www.iri.centrepompidou.fr/projets/socialweb/>.

27. J.L. Moreno, *Who Shall Survive? Foundations of Sociometry, Group Psychotherapy and Sociodrama*, Beacon House Inc, New York 1978, p95.

28. S. Wasserman and K. Faust, *Social Network Analysis: Methods and Applications*, Cambridge University Press, New York 1994.

29. <https://developers.facebook.com/docs/reference/api/>.

to emerge. If we look at the Graph API that defines the core data structure of Facebook, we can immediately see its relevance to Moreno's sociometry.²⁹

Under the guise of being *free* and *friendly* to use, we can see in this example that the modulation of social relations can actually lead to what we have called 'disindividuation', which is not a condition of collective empowerment or mystical oblivion, but one in which, personally or collectively, agency as such is rendered unobtainable, as the coherence of personally or collectively individuated entities is disrupted. To take the universe of social media as an example, just consider the ways in which the attention of each social atom (or 'person') is sliced into ever smaller pieces and dispersed across networks via status updates, interactions, advertisements for marketing purposes. One can spend hours on Facebook out of curiosity without achieving anything. The 'collective' on Facebook becomes a distraction, a cause of the dissolution of structures within individuals, but not a site of new modes of empowerment.

The core idea of our project was therefore to develop a group-based social network based on Simondon's concept of collective individuation. The introduction of the idea of collective individuation into the new model involved an attempt to reintroduce incompatibility and intensity into the modulation process. In this conceptualisation, projects - which must also be understood here as projections instead of *telos* - are prioritised instead of being subject to the random status updates of individuals. The question which emerges here is: how can we transform individuals into groups capable of actually achieving social ends? One of the answers that we proposed was that this could be achieved through finding mechanisms to modulate their relations, by deliberately setting up creative constraints, which would act as the grid of the triode modifying the dynamic of the flow of electrons. For example, after registration, the user can only use the full functions when he or she participates in a group or creates a project; the other example is to limit the number of tags one can add to an object to five, so that adding a tag means one has to delete the less relevant one: by doing so the object can be described in the most updated and accurate way. This rearrangement of relations makes the group and project the default instead of the individual. The groups become the places where incompatibilities arise and also the place where they can be resolved according to the progress of the projects.³⁰

Analyses such as those of Galloway and Rouvroy offer acute observations of the effects of digital technologies as modes of control, especially Rouvroy, who sees them primarily as tools of disindividuation. But their lack of engagement with speculative metaphysics - in the thought of Deleuze as well as Simondon - from which some of their own key notions derive, can easily lead to impasses and paradoxes such as we have explained above. Simondon's understanding of modulation can be situated between Deleuze's ontology of modulation and his technical theses about the deployment of modulatory techniques within control societies, allowing us to see how taking this thinking of modulation further can allow us to develop other models of social interaction, by addressing the

30. For more details on this project, please refer to Yuk Hui and Harry Halpin, 'Collective Individuation: The Future of the Social Web', in G. Lovink(ed.), *'Unlike Us' Reader*, Institute of Network Cultures 2013.

question of tensions, incompatibilities, intensities, amplification, structural transformation, and psychic and collective individuation. These models need concepts that put both humanism and technological determinism into question. Simondon's principle of individuation can perhaps provide us with a critical lens through which to look at the operation of social digital technologies. The dialogue between Deleuze and Simondon on modulation which I have staged here - traversing contemporary digital technologies - has been conducted in order to re-establish the concept of modulation as a useful metaphysical category, and not only a description of the mechanics of power in control societies. At the same time it has tried to show how that concept, revived and better understood, could be deployed in both understanding and resisting such mechanisms of power. As our concluding example shows, a rigorous understanding and analysis of modulation could enable us to develop new models and new ways of thinking about the social, which is in itself a form of resistance to the destructive and restrictive forms of power analysed by Deleuze and many of his followers.

I would like to thank Axel Anderson, Dan Ross and the reviewers for the valuable comments on this essay.

Yuk Hui is currently postdoctoral researcher at the Institute of Media Culture and Aesthetics of Digital Media at Leuphana University, Lüneburg; previously he was researcher at the Institute for Research and Innovation at the Pompidou Centre in Paris. He is co-editor of *30 Years after Les Immatériaux: Art, Science and Theory* (2015), and his monograph, *On the Existence of Digital Objects*, will appear soon with University of Minnesota Press.

Copyright of New Formations is the property of Lawrence Wishart Ltd. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.