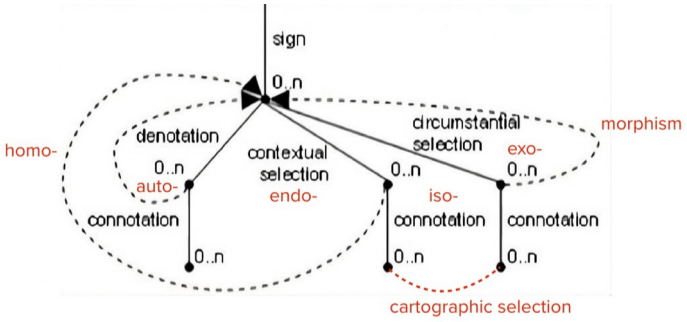

Fig. 1—Umberto Eco's semantic markers in a metapattern-based model (from Peter Wisse [2005] *Semiotics and sign-exhange: design for a subjective situationism, including conceptual grounds of business information modeling*). Heuristic amendments in red. 0..n = order of n. The compound model is the full cycle needed for a *sign-value* to emerge.

The cartographic resource will today have applications in areas where pathfinding and goalseeking are taking place conjointly. It establishes some criteria of readability in such applications. Its assignments comes from *extensional semiotics*: the domain of extra-linguistic signs that become candidates for signification at the rim of the human realm, and for meaning once they enter/visit it. Extensional semiotics is an application of *graph theory* that studies/manages extensional signs: signs that are defined such that can be defined by *extension*, while remaining intentionally *remote*.

Extensional semiotics there affords the study/management of *intention*: the articulation of intention through *assignment* (rather than e.g. assumptions about it). The proposition is to let extensional semiotics define from the part of graph-theory that deals with *mapping*, and specify under which conditions it will take on the *cartographic* assignment. Homomorphism features the statement of articulations at the said rim. According to J. Schreider's terminology (1975) this rim can be articulated between a domain of *departure* and a domain of *arrival*. Cause-effect; means-end.

In the cartographic application, furthermore, the practice of graph-theory *itself* is moved from abstract algebra to a domain where completeness is *not* restricted to the conclusion of a mathematical proof *per se*, but is considered as a *condition* to move onwards: proposing a handrail for cogency in decision-making (which is what effectively makes the application cartographic). Such attempts have previously been ventured with what anthropologist Claude Lévi-Strauss called the exhaustive method (featuring Marc Barbut's 1968 application of Felix Klein's 1872 math).

But if we look for a way of mapping graph theory unto its application in cartography—as a working definition of extensional semiotics—then we also move *from* the identity of the terms related in the domain of departure and arrival, the structural similarity between the groups to which they belong, the productive difference between them in terms of meaning, *to* the heterostructural conditions that separates them. Completeness is here determined by a *full round* from identity and similarity, to difference and otherness. Same, similar, different and other. Here we will limit ourselves to state that these categories, phases or tropes were indeed abstracted by math, but by no means invented in mathematics.

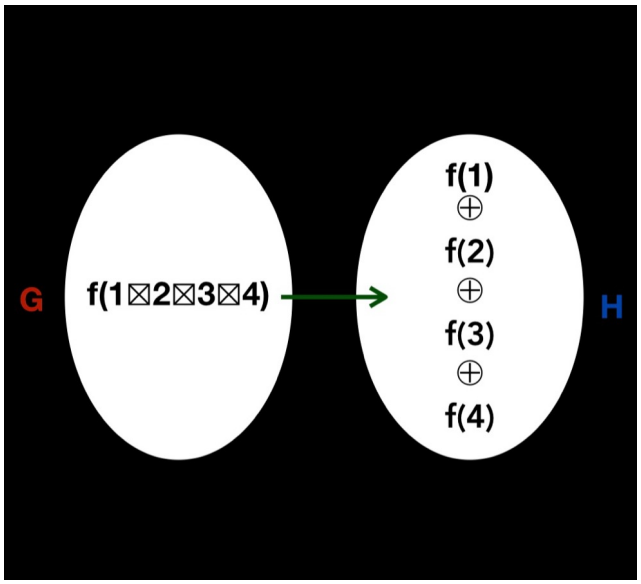

Fig. 2—diagram of the general sense of homomorphism as a mapping from a domain of departure G to a domain of arrival H. G and H are non-identical but similar, in the sense that there is a structural similarity between aggregates in G and H that are such that the one G can map into the other H, as evolve.

In mathematics they follow from the broad definition of homomorphism and extend through automorphism, endomorphism, isomorphism and exomorphism (the latter exceeding the framework of pure math to the study of complexity in e.g. disordered systems): from the broad notation of homomorphism as {f: G—> H | f(1 ⊠ 2 ⊠ 3 ⊠ 4)—> f(1) ⊕ f(2) ⊕ f(3) ⊕ f(4)}, where the symbols ⊠ and ⊕ are *related* forms of addition (i.e., +) but *not* identical ones. In aggregating ongoing operations, tasks are not added to each other in the same way as when account for them

in a time-sheet. Still they are sufficiently similar to one another to warrant e.g. what we call *accountancy*: or, more broadly, as an *ecological* accountability, with which we are concerned here.

Without homomorphism—defined as 'the *same form*' preserved from the domain of departure and the domain of arrival—accountability would *not* be possible: indeed, it wouldn't even exist. For this reason, homomorphism is of the essence when we call for the accountability in conjoint pathfinding and goalseeking (which is the cartographic substance). While operations *compile* and sums *merge*, there are also other forms of aggregates that can advantageously be accounted for. Indeed, the difference between compiling and merging will provide a category of data, by *computing*.

Here it will not be considered sufficient that compiling and merging are subcategories of computing. Simply because computing aggregates in *coding*. We have the choice between considering coding as *specific* as the computer language used for coding, or more *generically*. However, if it is the *map* defined by homomorphism between G and H, it is always the specific instances that interest us with *mapping* (and as such features what we call the *map*). Then we will assume that computing aggregates *differently* from compiling and merging, and articulates this difference.

From the vantage point of coding we will be able articulate the difference between the *departure* domain **G** and the *arrival* domain **H**—as defined by compiling and merging—in terms of *operations* (**G**) and *distribution* (**H**); which are distinct between *operational* monitoring and time-*sheets*. It will then be at the computational level that the relation between compiling and merging can be defined in terms of the preservation of form/structure (which defines homomorphism in the first place). We may argue that computation is *implicit* in homomorphism, or simply explicates it in terms of *data*.

Here we arrive at the thorny question on the nature of data. Above features a differential definition articulated specifically at the level of code: raising the question of *how we map data*. Essentially, for each new mapping that we have been considering thus far, each solution has hatched a *new* mapping-problem: making us evolve in the way we proceed (pathfinding) and the nature of what we are looking for (goalseeking). Moving onwards from here to the notion of 'programming from data', another mapping problem comes up on the horizon: the mapping of data (e.g. in AI).

If we take one step back and look at information from the vantage-point of Claude Shannon's *communication* theory, information is linked to the loss of signal-clarity (with a mathematical expression borrowed from the study of *entropy* in physics [2nd law of thermodynamics]), we can pursue our discussion within the broader framework of physics. In the cross-pressure between the weight of a glacier and the rock-valley on which it moves, a *pattern* emerges which is hetero-structural in the sense that it neither is found in the glacier nor the rock: *a bed of hexagonal rods*.

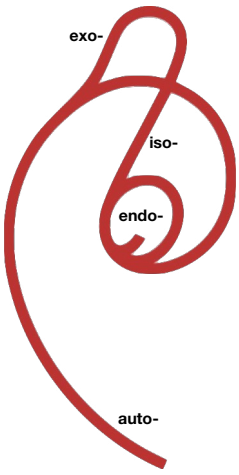

Fig. 3—*Homomorphism* conceived in *cartographic* terms, as a single but complex mapping requiring a full job of running through auto-, endo-, iso-, exo-morphism to be complete. Here, the function of homomorphism is not to study/manage abstract algebra, but to put in the work required to have a *sign-value* for sustainable meaning to hatch.

Compression produces a hexagonal pattern which is not otherwise found in ice, which forms this bed. Such phenomena featuring *systems-like* properties is called a *disordered system.* Could we com-pare this phenomenon to the one produced by compressing data in AI? That patterns emerging from compressing form a new layer of data which contain the data of compressing: e.g. data on the ice and the rock valley… from this possibility arises the question of critical mass: the threshold needed for a disordered system to come about, in a *ratio* between information/exformation (the latter defined here as a *removal* pattern).

In my own professional practice the operative and distributive mapping is 1-to-1 since the tasks jointly add by the operations *and* by the clock: it is an automorphism contained by my practice. In the homomorphism contained by the students' practice the time is not clocked. It is an endomorphism. The department's study plan is 1-to-1 since if maps *and* regulates teaching. In the three specialisations at the dept. of design, it is not 1-to-1 because creative practice is *not* clocked (though it works on the premise of available time). The point of the model is to offer a way to study and manage the *work*—or, the complex exchanges—to establish the ecology of what we call a *sign value*. That is, as ground work and premise for meaning, based on *completeness*. The cost of not attending this work is the loss of clarity of message/signal. Here data are the negentropic (non-cancelling) *counterpoint* to information as entropy.

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