SOME ESTHETICAL VALENCES OF THE SPATIAL LOCALITY. TOWARDS ARTIFICIAL ESTHETICS

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ABSTRACT

This paper tries to model an "esthetical behavior" supporting the interconnected structures. Based on the concept of structural self-organization it defines the collectivity as a set related by the structural relations. While the structure (esthetical or not) is a concept, the representation or the image is an intuition (according to Croce). Nearby the structure, opposite to the function, is the image as an intuition. The esthetical structures are characterized by significant intuitive representations. Thus, the perception of the structural self-organization of a work of art is, finally, an intuition. Or, the esthetical function is the expression of the work of art. The concept of the esthetical structure and the intuition of the esthetical representation form the two sources of the conception/reception of a work of art. We introduce the notion of "interconnected esthetical collectivity" and, on this background, we try to model an esthetical behavior supporting the esthetical locality concept.

Keywords: interconnected esthetical collectivity, esthetical locality

1. INTRODUCTION

"*The knowledge has two forms: it is an intuitive knowledge or a logical knowledge; a knowledge by the imagination or a knowledge by the intellect; a knowledge of the individual or a knowledge of the universal; of the things considered each separately or a knowledge of their relations; it is, finally, a producer of images or a producer of concepts…. The intuition means, frequently, the perception, i.e. the knowledge of the happened reality, the perception of something as real*" (Croce 1971).

A complex system perception, as of a work of art, means first of all the perception of a *self-organization* of the system or of the *relations* that organize the system. To perceive a complex, said Wittgenstein, *"means to perceive the relations of its constituent parts in a determined way"* (Wittgenstein 1991). On the other hand, one of the natural characteristics is the *association in collectivities*. Professor Moshe Sipper said in the foreword to a recent book, that through the computing terrain during the past few years a new wind has been swept, *"slowly changing our fundamental view of computers. We want them, of course, to be faster, better, more efficient - and proficient – at their tasks. But, more interestingly, we are trying to imbue them with abilities hitherto found only in nature, such as evolution, learning, development, growth, and collectivity"* (Castro and Zuben 2005). We can observe collectivities in the not living world (universe galaxies, solar systems, crystalline units), in the living world (ant hills, bee swarms, nations) as in the artificial world (paintings, especially the abstract ones, architectures, cities). What *properties* are behind the relations that organize the collectivities, or, better said, the *relations of association in collectivities*? Maybe is the gravity, the symmetry or the survival instinct or, maybe, an *esthetical property*? In one word it is *structural self-organization*. The self-organization is based on *structural relations* (not dependable on time) between *structural entities*. The self-organization can be structural or functional (relations dependable on time).

The definition of the term *collectivity* deduces from the definition of the term *set*. "A set can be selected by a *membership* or can be constructed by a *relation which substantiate the membership* or by bringing in the set *elements which fulfill the relation defining it*" (Drăgănescu 1985). Because N. Bourbaki names "*collectivizing relation*" the relation defining a set, we name collectivities only the sets selected or built based on *relations*. Therefore, we exclude the sets selected by the membership, (the most general definition of the set). A collectivity does not mean, in our point of view, a set made, for example, of {*a star, 5, a planet, a crystal, c, an ant, a bee, a man*}.

The relation that proves the membership of a collectivity is resulted from its *structural properties*: a collectivity is made of smaller *structural entities*. For example, an interconnecting relationship is composed of a set of nodes and links which is equivalent with the graph definition (a set X of nodes and an application Γ of X in X which gives the set of connections). The *link*, the *connection* is a *structural property* for an interconnection or a graph.

2. ESTHETICAL STRUCTURE AND INTUITION

A basic concept in this article, which we have used but not explained, is the concept of the *structure*. The *structure concept*, at the beginning with the meaning of building (from the Latin noun *structura*), has slowly advanced. In English and French the word has the same meaning: edifice, way to build. The abstraction of the word makes slowly: only in the XVII-XVIIIth centuries appears in the sense of *a reciprocal relation of the parts* or *the constitutive elements of a whole, determining its nature, its organization* (Nemoianu 1967). During the XIXth century, structure is generally opposite to function, like static to dynamic. The end of the XIXth century brings a new meaning of the structure concept. It will begin to represent not a static organization, but a *whole made by solidary elements, in which everyone depends on all* the other *ones and can be what it is only in and through them*. The *connection between parts* (the first meaning) is something less necessary than the *total interdependence system of each part with all other parts* (the second meaning). If the first meaning is a *sum*, the second is a *whole*. *The whole can dominate the part* (Okakura 2007). This turning point coincides with the penetration of the structure concept in the humanities. The term has been changed by a synonym, *Gestalt*. *Gestalt* is not understood beginning with the form, pattern, structure, but the behavior of an organism, a whole. *Gestalt* is related to an *entelechy*, a term appointing the features of geometric figures or melodies by which they exceed the *sum* characteristics. A geometric figure remains itself even if it is decreased, enlarged, color modified. This invariance of the transposing is also known by the name of *isomorphism*. In this way, the linguistic researchers have contributed resolutely to the understanding and to the using of the structure concept unifying both meanings: the *coherent, coagulated globality* and the *relations system between local parts* or, in two words, the *globality* and the *locality*.

The structure is a concept while the *representation* or the *image* (Croce 1971) is an *intuition*. Nearby the structure, alike opposite to the function, is the image as a intuition. The *esthetical structures* are characterized by *significant* intuitive representations. Thus, the perception of the structural self-organization of a work of art is, finally, an intuition. "*The result of a work of art* (the conception and/or the reception, m.n.) *is an intuition*" (Croce 1971). The representation, in Croce's opinion, is an intuition that detaches and emphasizes on the *psychic background of sensations*. The representation is an *elaboration* of sensations, and therefore is an intuition. The concept of the esthetical structure and the intuition of the esthetical representation (of the image) form, in our opinion, the two sources of the conception/reception of a work of art. By the structure and the intuition, a work of art *closes itself*, the functional behavior isn't necessary to be understood (except the design and the other "functional" works of art). The work of art is a pure structure, an esthetical structure, which must be understood, inferred.

The *esthetical structures* are *esthetical collectivities*, i.e. sets built with the help of the *esthetical relations* resulted from the *esthetical properties*. An esthetical relation is a relation that *spiritually expresses* the connections between the collectivity entities on the basis of the esthetical properties (e.g. synthesized by the binomials *beautiful-ugly* or *symmetric-asymmetric*). The esthetical relations are by definition *structured*. "The complete process of the *esthetical production* can be symbolized in four stages: *a*) impressions; *b*) *expression* or esthetical spiritually synthesis; *c*) hedonic accompaniment or pleasure of beautiful (esthetical pleasure); *d*) translation of esthetical fact in physical phenomena (sounds, tones, motions, combinations of lines and colors). Anybody observes that the essential point, only which is proper esthetical and real is the point *b*, which is absent to the naturalistic manifestation and construction, and which is nominated, at their turn by metaphor, *expression*" (Croce 1971). The (esthetical) expressions are representations or images of an esthetical structure (work of art) which can be perceived in a certain succession, a temporal. The structural self-organization of a work of art means a spiritual esthetical synthesis or an (esthetical) expression. "The esthetical functionality" is replaced by an "esthetical process", the essence of which is, according to Croce, the *expression*.

The *structure of an esthetical collectivity* can be, as any structure, self-organized *locally* and *globally*. An interconnecting structure is locally estimated by neighborhoods. *The locality is the behavior or the structural self-organization of an (esthetical) collectivity around an* ***origin***. In case of an esthetical collectivity, the origin can only be spatial. The article refers to the spatial origins of a structure and the locality definition covers the first meaning of the structure concept (connection between parts). *The globality is the behavior or the structural self-organization of an (esthetical) collectivity around a* ***property***. For example, the works of art can be estimated by the help of *symmetrical* or *asymmetrical* properties. The globality definition refers to the second meaning of the structure concept. Therefore, an esthetical structure can be estimated, as any structure, by measures of the locality and the globality.

On the other hand, the *architecture of an esthetical collectivity*, connection concept between the esthetical structure and the *esthetical function* (the *expression of the work of art*), produces a *global meaning*, an *intuition*, of the collectivity with the aim to understand the unity between the structure and the expression of that esthetical collectivity. We can talk about universe's architecture, a crystallographic system's architecture, a house's or a town's architecture, an enterprise's architecture, a computer's architecture, an interconnecting architecture, a communication architecture or, finally, an esthetical architecture (of a work of art). *The esthetical architecture measures by the degree of membership to certain esthetical global properties*. The symmetry, hierarchy, homogeneity are also global properties, not only esthetical ones. We must not to confound the architecture concept, leading to an intuition on the collectivity, with globality concept, which is a measure of the collectivity.

We shall concentrate, in the following sections of this paper on certain esthetical structures. We try to give examples of works of art (paintings) which we analyze from the point of view of the locality and globality. Analyzing in this way, we probably have succeeded to algorithm a part of the *expressions* of the works of art and to understand *inferring* them. Our application can lead towards an "*artificial*" *esthetics*.

3. INTERCONNECTED ESTHETICAL COLLECTIVITIES

The interconnections made of N nodes and L links model very well, in the sense given by Wittgenstein to the perception of structural self-organization, a collectivity. The nodes are the members of the collectivity that are tied by links. This type of collectivities we shall name, further, *interconnected collectivities*. The interconnected collectivities will not limit at the sets with the same type of nodes (resulting collectivities with non homogenous nodes) and/or at the sets with the same type of links (resulting collectivities with non homogenous links). What is certain, the structural entities, which form the collectivity, are *interconnected one way or another*. We should limit, without losing too much of generality, to the *orthogonal interconnections* or *orthogonal collectivities*. Any number of nodes of an interconnection can be represented as a product of integer numbers, $N=m_r \cdot m_{r-1} \cdot \ldots m_1$. On the basis of this representation, to each node of an interconnection we can associate an address X with r digits, $0 \leq X \leq N$-1. Further, we present some orthogonal interconnections as collectivities, i.e. sets selected or built by relations.

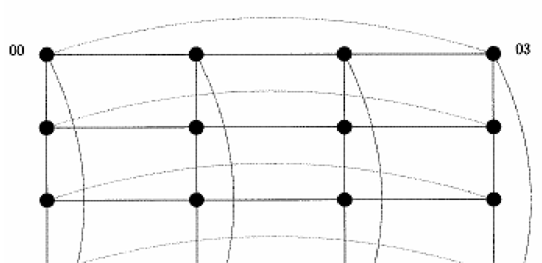

Figure 1: GHT Interconnected Collectivity

A *generalized hypercube*, GHC, is an orthogonal collectivity with $N=m_r \cdot m_{r-1} \cdot \ldots m_1$ nodes interconnected in r dimensions. In every dimension i of a collectivity the m_i nodes are interconnected all by all. The relation which establishes the interconnection of N nodes all by all is: the nodes addressed by $X = (x_r\, x_{r-1} \ldots x_{i+1}\, x_i\, x_{i-1} \ldots x_1)$ are connected addressed by $X' = (x_r\, x_{r-1} \ldots x_{i+1}\, x'_i\, x_{i-1} \ldots x_1)$, where $1 \leq i \leq r$, $0 \leq x'_i \leq m_i - 1$ and $x'_i \neq x_i$. The *hypercube*, HC, is a GHC with $N = m^r$. The *binary hypercube*, BHC, is a HC with $N = 2^r$ nodes, and the *completely connected structure*}, CCS, is another HC with $N = m$ nodes.

A *generalized hypertorus*, GHT, is another orthogonal collectivity with $N=m_r \cdot m_{r-1} \cdot \ldots m_1$ nodes interconnected in r dimensions. In every dimension i, $1 \leq i \leq r$, the m_i nodes being "collectivized" in a torus. The relation which establishes the r tori of GHT collectivity is: the nodes addressed by $X = (x_r\, x_{r-1} \ldots x_{i+1}\, x_i\, x_{i-1} \ldots x_1)$ are connected with the nearest neighbor nodes addressed by $X' = (x_r\, x_{r-1} \ldots x_{i+1}\, x'_i\, x_{i-1} \ldots x_1)$, where $1 \leq i \leq r$, $x'_i = | x_i \pm 1|_{\text{modulo } m_i}$. The *hypertorus*, HT, is a GHT with $N = m^r$ nodes and the *torus*, T, is a HT with $N = m$ nodes. BHC can be and HT with $N = 2^r$ nodes.

A *generalized hypergrid*, GHG, is, also, an orthogonal collectivity having $N=m_r \cdot m_{r-1} \cdot \ldots m_1$ nodes interconnected in r dimensions. In every dimension the m_i nodes are being collectivized in a *chain*, or, better said, every node X is connected in a *grid* with the nodes addressed by $X' = (x_r\, x_{r-1} \ldots x_{i+1}\, x'_i\, x_{i-1} \ldots x_1)$, $x'_i = x_i \pm 1 |\ x_i \neq 0$ and $x_i \neq m_i - 1$; $x'_i = x_i + 1 |\ x_i = 0$; $x'_i = x_i - 1 |\ x_i = m_i - 1$, for $1 \leq i \leq r$. The *hypergrid*, HG, is a GHG with $N = m^r$ nodes. The *chain*, C, is a HG with $N=m$. A binary hypercube can be, also, a hypergrid with $N = 2^r$ nodes.

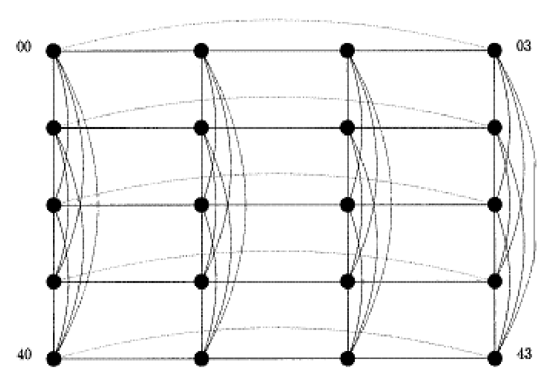

Figure 2: GHS Interconnected Collectivity

GHC, GHT and GHG are collectivities represented as *homogenous at links interconnections* or *homogenous interconnections* (the collectivities are homogenous at nodes, also; this paper does not refer to the non homogeneity at nodes). Most generally, the *non homogenous collectivities* can represent as non homogenous (at links) interconnections. Examples of non homogenous collectivities are the collectivities represented by *generalized hyper structures*, GHS, (Lupu 2004). A GHS is an orthogonal collectivity with $N=m_r \cdot m_{r-1} \cdot \ldots m_1$ nodes interconnected in r dimensions and in which every node X is collectivized (connected) in every dimension i, $1 \leq i \leq r$, to the nodes addressed by a *collectivizing (interconnecting) vector* $\left(\bigcup_{j=1}^{k_i} X^{ij}\right) = (x_r\, x_{r-1} \ldots x_{i+1}\, x'_i\, x_{i-1} \ldots x_1)$. $\left(\bigcup_{j=1}^{k_i} X^{ij}\right)$

specifies that a node of GHS is connected (non homogenous) by a *vector of elementary collectivizing structures* instead of a *single* structure in the homogeneous collectivities. This is non homogeneity at links of GHS specified by the collectivizing vector having, on the one hand, r elements, and on the other hand, k_i, $1 \le i \le r$, elementary collectivizing structures (homogenous) for which are specified the unions $\left(\bigcup_{j=1}^{k_i} X^{ij}\right)$, $j = 1, 2, \ldots, k_i$. So, X^{ij} are homogeneous elementary structures, like tori, grids, and chains, and must not be disjoint for a dimension.

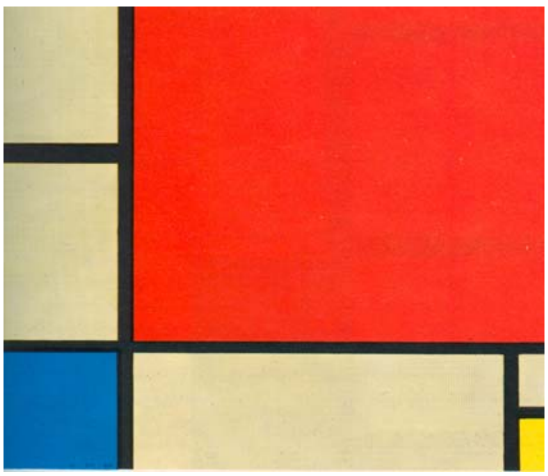

Figure 3: Mondrian, *Composition in red, blue and yellow*

In the figures 1 and 2 we give two examples of simple associations in collectivity modeled by a homogenous interconnection (fig. 1) and by a non-homogenous interconnection (fig. 2). At homogenous regular interconnections, as the GHC or HT, the origin position, "point of view", does not matter. The collectivities, which they model, are *spherical*. The diameter is the same, doesn't matter the point of view. At irregular networks, as GHG and other non-homogenous interconnections (e.g. GHS), it matters where the position of the origin is, it matters the point of view. The "structural" behavior around the origin at the collectivities modeled by these interconnections, is not spherical anymore. Why does the origin position matter? Because the structural non-homogeneity of an association in a collectivity from an origin is equivalent to a "functional potential" or, in this article's case, an "esthetical potential" from the same point of view. For example, the more numerous and more varied the links in an interconnected collectivity from a point of view (a origin) are, the more sophisticated, more *adaptable* at a demand, or more *self-organized* the functions are. The interconnected collectivities, homogenous and non-homogenous, can be appreciated, at the beginning, by two general measures: the *locality* and the *globality*. The present paper refers only to the locality.

In the figure 3 we present an interconnected collectivity from the artificial esthetical world, an *esthetical interconnected collectivity*. It is a work from 1930 of Piet Mondrian, one of the first abstractionist painters. In the beginning Mondrian knew a cubist period, working in Paris with Braque and Picasso. It wasn't long till he separated from them, because of his need to draw of cubism the "logical conclusions", which they did not draw. Regarding the object, which is still visible in cubism, it could keep *the lines, the rhythm and the colors*, and order the painting canvas with only one aim, the *creation of an autonomous composition* (Muller and Elgar 1972). The Mondrian work (fig. 3), except the colors, may resemble with an orthogonal collectivity the nodes of which, in a first phase of study, are at the intersection of the colors. In the figure 4 we present the bidimensional interconnection that corresponds with the Mondrian composition from the previous figure.

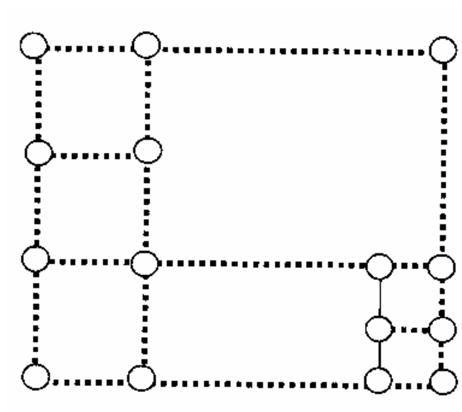

Figure 4: Interconnected Orthogonal Collectivity Overlapping to Mondrian Composition

4. ESTHETICAL LOCALITY

The collectivities structurally modeled by the interconnections (nodes and links) may be structurally estimated at the beginning, as primordial measures, by *locality* and *globality*. The *locality*, as we explained before, is *the spatial behavior of a collectivity around an origin*. As in Physics, where the gravity characterizes the attraction between objects, *the locality defines a collectivity*: the nearest the entities that compose the collectivity are, the best communicated, the best interfered, or in the case of the interconnected collectivities, the nearest the nodes are, the bigger the interconnection power is. In the esthetical collectivities, a bigger interconnection power can mean a bigger *expression power*. Consequently, the intuition of the structural self-organization of a work of art is bigger. Consequently, the intuition of a work of art is more intense. We name this kind of locality, *esthetical locality*. The esthetical locality helps us to understand (partially) an esthetical collectivity.

As we have explained in the introduction, the locality definition refers to the first sense of the structural concept, the connection between entities or, in interconnected collectivities (and esthetical ones), the links between nodes. Analytically, the locality in an interconnection measures by neighborhoods, neighborhood's reserve, *Moore* reserves and, synthetically, by diameter, degree or average distances. As any property which organizes the entities, the locality may be studied first *structurally* (topologically) and then *functionally*. In the present case, the esthetical functionality is replaced by the *expression*, as we have already explained. Therefore, the locality of an esthetical interconnected collectivity will be defined by two partial localities: a structural locality and an *expressive localit*y (which replaces the functional locality from my earlier works). The structural localities appreciate by the simplest measure: *neighborhoods*. The neighborhoods divide in *surface* (or radial) *neighborhoods* and *volume* (or spherical) *neighborhoods*. The surface neighborhood of an interconnected collectivity represents the entities, components or nodes number at the logical distance d, $SN_d(O)=N_d(O)$, where O is an arbitrary chosen origin. The volume neighborhood is $VN_d(O)= \sum_{i=1}^{d}N_d(O)$. The neighborhoods are analytical measures of the structural locality of an interconnected collectivity. But the structural locality can also be measured by synthetic measures, e.g. by diameter: at the same number of interconnected entities, the less the diameter is, the bigger the locality (in the meaning of the agglomeration) is.

The neighborhoods and the diameters are functions on the original position. At the collectivities interconnected in homogenous and regular structures, as the generalized hypercubes or hypertori are, the origin position does not matter. At the collectivities interconnected in irregular structures, as the generalized hypergrids and other non-homogenous structures are, it does matter where the position of the origin is. The topographic model presented in some of my previous works helped us to describe and, therefore, to study the "structural" behavior of the interconnected collectivities in homogenous and, especially, non-homogenous structures. The properties of the locality can be better "read" by the diameter contour patterns in the structural relief of an interconnected collectivity.

Besides the contour patterns, we have also introduced a measure which helps us to estimate this structural relief from the locality point of view: the *state of agglomeration*. The structural localities of an interconnected collectivity are more or less *agglomerated* and can be read by the help of the diameter contour patterns, as we have explained in the previous paragraph. The depth of the *valley* (minimum diameter) informs us about the *maximum agglomerated locality*, and the height of the *peak* (maximum diameter) about the *minimum agglomerated locality*. Thus, the *structural state of agglomeration of a node (entity) of an interconnected collectivity is given by the interconnection diameter computed with the origin in the corresponding node*. The contour patterns of the structural states of agglomeration constitute a map with the *structural relief of the interconnected collectivity*.

The structural locality is invariable information depending only on the topology of the interconnected collectivity. A point of view explicitly *expressive* on the esthetical locality can consider a parameter E_O, where O is the origin of the collectivity, which can depend on logical and physical distances between the collectivity entities (d_l, d_f), the colors of the entity (c), the movements of the entity (m), the "pictorial" message distribution (φ) or/and other factors.

Expressive locality of an esthetical collectivity is measured, as the structural locality, by neighborhoods: an *expressive surface neighborhood*, $ESN_d(O)= E_O\cdot N_d(O)$, and an *expressive volume neighborhood*, $EVN_d(O) = \sum_{i=1}^{d} E_O(d)\cdot N_i(O)$. The neighborhoods measure analytically the expressive locality. As for the diameter, in the case of the structural locality, there is a synthetic measure for the expressive locality of an esthetical collectivity, the *expressive average distance*. Through this average distance, we can give a definition to the *expressive state of agglomeration*: *the expressive agglomeration state of a node (entity) of an esthetical interconnected collectivity is given by the expressive average distance of the esthetical interconnection computed with the origin in the corresponding node*. The expressive agglomeration state is so much bigger as the expressive average distance is less. By the aid of the contour patterns of expressive states of agglomeration can draw a map, which depict the *expressive relief of the esthetical interconnected collectivity*. We shall refer to other works on the expressive locality.

The surface and volume neighborhoods, on the one hand, and the diameter or the degree, on the other hand, are analytical and synthetic evaluation means of the interaction capacity of an interconnected collectivity, measuring the *structural locality*. By the expressive neighborhoods and, synthetically, by the expressive average distance express which part of the structural locality is used in the esthetical process implemented on an esthetical collectivity. The expressive neighborhoods and the expressive average distances express the *expressive locality* of the esthetical collectivities.

To evaluate the structural locality of an interconnected collectivity, esthetical or not, near neighborhoods, we propose a simple and absolute measure of evaluation: *Moore reserve* based on *Moore* bound. As it is known, *Moore bound* is the maxim number of nodes which can be present in a *graph* given the degree l and the diameter D: $N_{Moore}=1+l\cdot(((l-1)^D-1)/(l-2))$. This bound is deduced from a complete l-tree having D diameter and is the *absolute limit* for the *diametric volume neighborhood*, $VN_D\ (O)=\sum_{i=1}^{D}N_d(O)$, in any graph (interconnected collectivity) with the degree l and the diameter D. Except for the complete l-ary trees, this bound is difficult to attain. *Petersen* graph, completely connected structures or the rings with odd nodes number, are interconnections reaching the *Moore* bound. Therefore, it makes sense to compute for an interconnected collectivity how far is this bound: the farther away the *Moore* bound is, the worse the structural locality is. This is implemented by the *Moore reserves*.

The *surface Moore reserve* is characterized by the difference between the number of nodes in a corresponding *Moore* tree at the distance d, with the degree l, and the surface neighborhood in the considered interconnected collectivity: $SMR_d = l(l-1)^{d-1} - N_d$. The *Moore reserve* is defined by the difference between the *Moore* bound at the distance d and the volume neighborhood: $MR_d = N_{Moore}(d) - VN_d$.

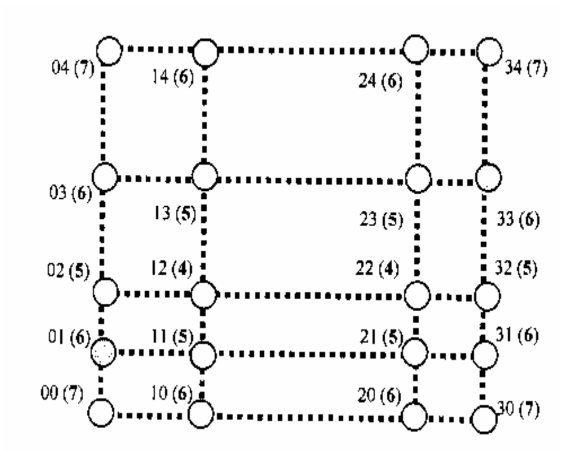

Figure 5: GHG Interconnection Corresponding to Figure 4

Let us come back at the bidimensional esthetical collectivity of fig. 4 and let us address the nodes corresponding to a mixed radix number system. From figure 5 results a "logical" GHG interconnection (logical because it does not take into consideration physical distances). GHG of fig. 5 is an interconnected collectivity with $N = m_1 \times m_2 = 4 \times 5$ nodes, from which 5 are intersection points (nodes) "false", "non visible". The network is a kind of "logical" raster of Mondrian work specifying the visible and non visible "nodes" (the intersection points of the colors). The generalized hypergrid, GHG, is a non homogenous (non spherical) network, the structure of which is not the same, regarding each node as an origin. In brackets are written with bolds the diameters depending on the origin position or on the "point of view". The structural relief is like a valley or, better said, a *doline* in a karst areas and it is drawn in the figure 6. The maximum agglomeration (the bottom of the doline having the minimum diameter) is in the middle of the "logical" network where there are the two nodes with diameter 4. We notice that the two nodes are not invisible. Coming next, raising up towards the doline edge, there are six nodes (from which two are false) having the diameter 5, eight nodes (from which three are false) having diameter 6 and, finally, the corners of the network with diameter 7.

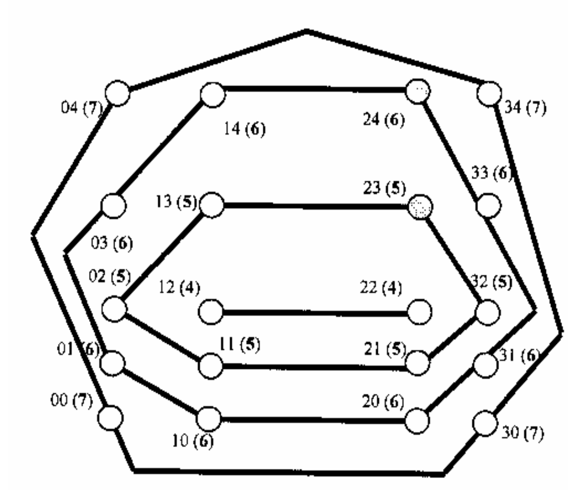

Figure 6: Structural Relief of Mondrian Painting Modeled with an Interconnected Collectivity GHG

Let us comment this distribution of states of agglomeration on the GHG collectivity corresponding to the Mondrian work. The maximum agglomeration (the minimum diameter, 4), an inverse "ridge" with two visible nodes (intersections of colors), is placed between the two of the most interconnected areas, on the left side and on the right side of the painting, in the "logical" middle of the interconnected collectivity. Climbing up to the doline edges, we come across a contour pattern with diameter 5 that have the invisible nodes *asymmetrically* arranged (an invisible node in the left colors intersections and an invisible node in the right colors intersections). The asymmetry of the invisible nodes increases at the contour pattern with diameter 6 towards the right-top side, the asymmetrical part of the painting. Mondrian leaves us, towards the right-top side, only with the painting edge, the red square, the biggest one. Mondrian painting is an asymmetrical work "as far as it is devoted to the worship of the *Imperfection*, deliberately leaving some things unfinished to complete by the play of the imagination" [Okakura, *Tea Book*]. In this way, the Asymmetry is a *structural communication*, a kind of a *structural dynamism* [Lupu, *Interconnecting*] in the *physical* collectivity representing Mondrian painting and in which there are two areas of *local* importance, the nodes {00, 02, 03, 04, 10, 12, 13, 14} and {20, 21, 22, 30, 31, 32}, placed asymmetricaly and non homogenously.

5. CONCLUSIONS

The (inter)connections are "patterns of discovery" (Alesso and Smith 2008). The interconnected collectivities are our models to esthetical behaviors. We have begun to model esthetical behavior by esthetical locality, a measure which can be estimated by neighborhoods, expressive states of agglomeration, expressive relief of the esthetical interconnected collectivity. We have exercised the esthetical model based on esthetical locality on an abstract painting of Mondrian. The esthetical locality makes the connection between the interconnection power and the expression power.

The preoccupations of artificial intelligence, artificial life and artificial sapience (Mayorga 2007) are the most well known. Why not an artificial esthetics?

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CRISTIAN LUPU is Chief Scientist at the Romanian Academy, Centre for New Electronic Architectures, and Associate Professor at the Politehnica University of Bucharest, Faculty of Electronics. He received a M.S. degree in Electronics (Politehnica University of Bucharest, 1972) and a Ph.D. degree in Computer Science (Politehnica University of Bucharest, 1995). He has been with the Institute for Computer Technique in Bucharest (1972–1992) where he was Research and Development Engineer (1972–1979), Project Manager (1979–1989) and Head of Laboratory (1989–1992). He was among the first people who applied the technique of microprogramming in computer designing in Romania. Also, he was the first who designed a Romanian anti-skid system controlled by a microprocessor. As Professor of Computer Science he gives lectures about computer architecture and interconnection networks. In the last two decades, his main interest lies in the fundamental principles that underlay the evaluation/designing of the direct interconnecting networks, especially under structural point of view (Locality, Globality, Symmetry). He contributes in the area of interconnecting by emphasizing and studying Generalized Hyper Structures by a new topographic model. Dr Cristian Lupu is the initiator of some new theoretical concepts such as Group Locality, Interconnected Collectivities and Esthetical Collectivities. Dr Cristian Lupu has published more than 120 communications, articles, and reports. He has written seven technical books devoted especially to microprocessor designing and interconnection evaluation. For the book *Interconnecting. Locality and Symmetry in Orthogonal Networks of Computers* he received *Gheorghe Cartianu* Prize of Romanian Academy, in 2006. He has three patents in microprogramming and microprocessor applications. He is a member of ACM, IEEE/Computer Society/Technical Committee on Computer Architecture and IEEE SMC Society Industrial Committee. One may find the biographical profile of Dr Cristian Lupu in the 25th *Silver Anniversary Edition* of Who's Who in the World/2008.