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THE TREE, THE MAN AND THE CITY: THE CASE OF SEVEN MAPLE TREES IN VELES

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ABSTRACT: The pronounced global crises caused by the effects of climate change is causing an essential need to rethink and redefine the basic assumptions about our relationship with nature. As more and more of the world's population lives in urban areas, the responsibility for the relationship to nature is increasingly shifted to urban contexts. The city had an ambivalent attitude toward nature and today we have to find the essential forms of mutual relation. The question of nature in the city today is still perceived through the quantitative relation between the green area and the built area where at what is missing is the essential personal relationship with the elements of nature. The relationship between man and the tree enters the deepest layers of its existence and reflects the continuous experience of dialogue with nature. This research will address the phenomenon of individual trees in public spaces that create specific areas of the city and their role in the spatial and symbolic support of neighborhoods. Through the example of the seven maples in the city landscape of Veles, we will explore the essential relationship among the man, the tree and the city. The six maples are the focal points of the urban texture. At the level of local neighborhoods, they are local centers. At the city level, they create a network of public places. They are the product of the traditional spatial social patterns through which the city was generated. The aim has been to document the cases of individual trees in the city, explain their relation and propose a methodology for reading this essential relationship. Drawing from the traditional cases of individual dominant trees as generative factors of human communities, we have pointed out the shared but also individual experience of correlations with nature as a common ground for reacting to climate change impact.

KEYWORDS: *dominant trees, urban texture, social spatial patterns, nature, city, architecture*

INTRODUCTION

The intensive extension of human activity in nature gives rise to the question about the elementary relationship of man with nature. What is our perception of nature and what is our particular relation to nature? Since 2008 and for the first time in history, more than 50% of the world's population has been living in urban areas and this percentage is expected to increase to 70% by 2050. This implies a dramatically changed urban/natural landscape ratio in which the city not only changes its boundaries by extension of its figure at its natural plan but also the inner structure of the established urban order (Nijunhus, 1992). In front of us, there rises a transitional new global urban reality between the urban and the rural, the artificial and the natural, in a context which can be referred to as the endless city (Burdett&Sudjic, 2011). However, if we presently observe the dominant quantitative parameters of the relationship with nature, it seems that we will have to reconsider again the essential relationships between man and nature.

So far, the modern city has mostly been based on spatial reformation and with opening the city to nature the green city became a model for our civilization (Lawrence, 2006). In the example of the project entitled Manifest of the Future City by Le Corbusier, a generative model for reconstruction of the modern city has been established through the principles of decongestion of the built area and increase of parks and open spaces (Le Corbusier, 1929). As to the hypothetical question about the way in which nature will be established in the midst of human labor, Le Corbusier wrote "*The City of tomorrow could be set entirely in the midst of green open space*" (Le Corbusier, 1929). This idea about the quantitative relationship to nature also remained in the post-modern phase of the city, in conditions of considerably changed re-

lationships within the inner structure of the city and between the city and the environment. In the project Metacity/Datatown, the city is a diagram of mutual relationships among primary elements (MVRDV, 1999). However, Datatown is based only upon data. It is a city that wants to be described by information, a city that knows no given topography. Datatown is constructed as a set of data collected and selected per sectors. So, the nature sector is interpolated as sector (C) O₂, proportioned to absorb the entire CO₂ produced in Datatown. However, if in the new global context, the city is increasingly getting a quantitative dimension, becoming a quantitative construct, it is increasingly deviating from the authentic individual experience of man and the specific place. In that sense, under the new circumstances, we should perceive the city through a trans-historic experience - as a place of layered different essential experiences, layered and juxtaposed different phenomena of the artificial and the natural.

At the end of the XIX century, Camillo Sitte criticized the modern systems and pointed out the importance of the relationship to a particular greenery in our cities (Zite, 1909; Zite, 1967). Reviewed Mechanical Approach to Supporting the Greenery with Examples from Rome and Constantinople, with Individual, Lonely Trees in the Urban Environment as a source of Poetry of the City. Camillo Sitte wrote "All those who have seen Rome will remember that powerful palm tree at Laterano. The entire picture is enriched by the lonely tree, visible from afar, through the multitude of streets. That single palm tree gives Rome a characteristic of a southern city because this single trunk stimulates the imagination in the same way as an entire row of palm trees" (Zite, 1909; Zite, 1967). It is exactly these individual trees that connect us with the essential layers of the place, with "remnants of national history and folk poet-

ry”. Precisely, we wanted to re-examine the sensibility of the elementary relationship to nature and trees associated with the tradition of morphological compositions of our cities through a series of specific situations related to the tree and the city and examples of everyday situations concerning the tree, the man and his artifacts.

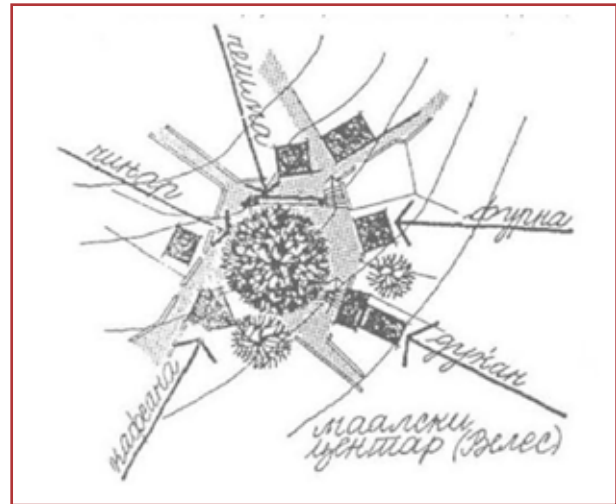
Humanity has long been concretely and symbolically fascinated by trees. Their source as a deep archetype of absorption started at the earliest times. The multitude of their meanings arises from their morphology. Through its branches and leaves, the tree receives the forces of light and sky, while through its roots it merges with the earth and the water (Chevalier and Gheerbrant, 1983). In many cultures, there is a belief that the tree is Axis Mundi or World Axis, supporting and holding the cosmos. The tree has the aspect of a world axis: the branches above are the kingdom of heaven, while the roots below form the kingdom of the earth, the world below. The trunk is the world axis around which the whole world revolves, representing, at the same time, the centre of life or the main artery of life throughout the world.

The Seven Maple Trees in Veles/Methodology

The spatial pattern of individual trees and the city has also been recognized in a traditional Balkan city. The individual trees mark the central positions of the nodes, the public areas of the city, the neighborhood, centers, the places of social activities of people etc. In the presentation of this pattern, one can recognize a dominant tree, a fountain, a furnace, a tavern, a shop around which people gather as part of the program and social core of the aggregation of individual residential units (Fig.1).

Fig. 1

Scheme of a traditional neighborhood center with an individual tree and subsequent programmatic concentration: fountain, furnace, tavern, shop.



In the example of Veles, we can distinguish seven maple trees at six key positions in the city. Five nodes have one monumental tree each, while one has two trees. Veles is a city in which there the traditional urban texture still persists, characterized with the irregular street scheme with densely built physical structure. The city lies on two slopes on both sides of Vardar river, St. Elias on the left and Kojnik on the right side. The modernization procedure, primarily refers to the new infrastructural undertakings, the railway line along Vardar river that globally connected the city with the Skopje – Thessaloniki railway system, while locally, it divided/separated it from the Vardar river bank, and secondly, the interpolation of the new architectonic compositions in the central parts of the city. The modernization in the central areas enabled preservation of the traditional basis on the pronounced slopes of the city. It is its extreme topography that has produced extraordinary dramatic effects on the residential topology and the street sequences of the city. Out of the six nodes with seven maple trees, four nodes are on the right bank, while two nodes are

on the left bank. The localities referred to as Srmale, Saat Kula (the Clock Tower), Kojnik, Goren Grad (Upper Town) are on the right side. Chitkusheva fountain/The Holy Mother of God, Varnalii are on the left side (Fig.2). Their toponyms represent the places and landmarks of the parts of the city to which they belong.

However, in order to explore their particular character, the relation of the maple tree with the open space, the character of the open space and its relationship with the city, we will utilize a morphological analysis of the open space. In that sense, we will start with the basic morphological decompositions of the urban form. For each specific place, there has been derived a frame (120 m x 120 m) as a critical area where one can express the particular character of the distinguished node and its interaction with the immediate context, but also as an arbitrary anthropometric distance in space ($p = 60$ m). Each of the distinguished areas will be subjected to three morphological analyses. The selected spatial examples will be perceived through a *convex map*, an *axial map* and through their *isovist*. While constructing the convex map and the axial map, we will use the initial assumptions of spatial representation and analysis of Hillier and Hanson (Hillier and Hanson 1983; Hillier, 1996). Concerning the establishment of the isovist, we will use the isovist concept and methodology developed by Benedikt (1979).

A space is considered convex provided that, for each two points, it contains a complete linear segment that connects

them. A convex map of a spatial system implies maximum two-dimensional extension of local spatial segments and is composed of the minimal number of convex spatial segments contained in that system. The convex map determines the character, the size and the number of spatial segments that make a spatial system.

The axial plan refers to the maximum unidirectional extension of space. It is presented by entering a minimal number of axial lines that connect the spatial system. Through them, one can express the geometrical structure of the spatial system and their penetration into the surrounding context.

An isovist is an area in the spatial environment that is directly visible from a selected location inside that area. An isovist is a set of all points visible from a given vantage point in space within a given environment. The shape and the size of the isovist depend on the position of the point and the geometry of the environment. The isovist refers to the nature and the perception of space. Through the construction of the isovist from a particular point of a single environment, we can quantify certain data such as the surface of an isovist, the length of the visible boundaries of the isovist and the extension of the visual directions in the surrounding. By selecting the particular points of the maple trees in space as vantage points of the isovist structure, we can obtain the specific visual fields for each maple tree in the surrounding spatial system.

Fig.2

The seven maple trees: individual trees / spatial nodes (120m X 120m) in the context of the city of Veles (860m X 860m): Chitkusheva fountain / St. Bogorodica, The Holy Mother of God (1), Varnali (2), Goren grad, The Upper Town (3), Kojnik (4), Saat kula, Clock Tower (5), Srmale (6).



The Five Specific Places

The analysis will involve five nodes with five maple trees, namely, Chitkusheva fountain/The Holy Mother of God, Varnalii, Upper Town, Kojnik, Clock Tower (Fig.2). These have still preserved the spatial situation that can be the subject of analysis. In the modernization pro-

cedure, the town node Srmale with two dominant trees holding central position in the city has extensively lost its initial spatial relationship wherefore it will be omitted in the particulate analysis.

Chitkusheva fountain/The Holy Mother of God, is a complex spatial system composed of five streams. If one perceives it as a system of convex spaces, one can

recognize the main elements: the polygonal center, the trapezoidal inlets and the spatial segments of the street sequences. The maple tree is in its central polygon. The axial plan represents the geometry of the axial structure derived from the street plans penetrating the polygonal center. The isovist constructed from the vantage point in respect to the position of the maple tree points to the figure of the visual field, a four-point star with dominant extensions to the north, the south and the west side through the open space.

Varnalii is a complex spatial system in the northern part of the city, on the left bank, whose spatial function has been reduced by the regulation of the access traffic line in the city in north-south direction that touches this area. From the existing conditions, we can reconstruct its basic spatial character. It consists of two overlapped plateaus, south and north, in whose contact zone is the dominant maple tree and the fountain that, in that way, are affiliated to both sides. In topographic sense, both plateaus represent two terraces that collect the street routes from the east slope and connect them to the north-south route along Vardar river. Four street streams flow into the south terrace, while three street streams flow into the north terrace. The axial plan represents a complex geometry, first, regarding the convergence of the axial lines in the two distinguished nodes (north and south) and second, regarding their overlapping and connection. The isovist constructed from the vantage point at the position of the maple tree points out the character of the visual field, its dominant extension being toward north, south and east, in the surrounding environment.

The Upper Town is a local node in the southwest part of the city on the right bank that connects five street streams from five different directions. The convex map consists of a central polygon in which the maple tree and the foun-

tain are positioned. In it flow two street routes through a common extension. The remaining two street routes are directly connected to the middle polygon. The axial plan shows the convergence and the overlapping of the five routes in a single central core. The isovist constructed from the vantage point at the maple tree position follows the geometry of the environment. The visual field represents a five-point star with unequal arms, visual penetrations into the surrounding environment, with dominant west, east and north arm.

Kojnik is the dominant plateau in the western part of the city from which streets descend to different parts of the city. The convex map consists of a series of convex spaces that are lined up along the west-east axis and end in the central polygon of the node. At the boundary of the central polygon, there is the maple tree and the fountain. Within it flow three street routes previously connected by several street sequences and two street routes that are directly connected to the central polygon. The axial map is a structure in which axial lines from different routes are directly and indirectly overlapped and connected. The isovist constructed from the vantage point at the position of the maple tree shows a pronounced extension of the visual field in east-west direction.

The Clock Tower has a central position in the old town on the right bank. It encompasses the neighborhood node with the maple tree and the fountain, but through one of the street routes, it is connected to the clock tower, which is the landmark of this locality and the city of Veles. The convex map consists of a central polygon in which the maple tree and the fountain are located along with the four street streams that flow into it. The axial map consists of three main routes that constitute this node, north-south, southeast-southwest and southeast-northwest, and sec-

ondary routes that follow. The isovist constructed from the vantage point at the maple tree position has the shape of a four-point star with dominant extensions to the north and northeast side.

Relationships

In order to be able to perceive the selected individual localities, as well as to understand their nature, it is important to compare them successively at the level of each morphological cross-section as well as at the level of the whole city (Fig. 4).

We will analyse the convex maps at the level of *thematic maps* and at the level of the *basic map* of the node. The *convex maps* of a single node will be all convex spaces through which pass the axes that directly converge in the central spatial polygon of the node. However, we will also investigate the basic convex cluster within which the spatial segments that are directly connected as extensions to the referent places of individual localities. *Thematic convex maps* of a single node are all convex spaces through which pass the axes that directly converge through the central polygon of the node and/or pass through the referent places of the individual nodes. For example, in the case of Chitkusheva fountain/The Holy Mother of God, the street extension toward the open courtyard of the church of the Holy Mother of God is also encompassed. In the case of Varnalii, the picturesque street along which representative Varnalii houses are lined up is encompassed. In the case of the Clock Tower, the extension leading to the Clock Tower is also encompassed. In that way, the thematic maps encompass all convex spaces through which pass the axes that are spatially and/or semantically connected to the considered node. The basic and thematic maps point out the structure and the complexity of the spatial systems. The thematic maps show the complex configurations of these locali-

ties, whereas the basic maps refer to the typology of the node. The central polygon (0) with a maple tree and a fountain, represents a starting point of a series of aligned spatial sequences through which the axes pass that converge in the middle of the node. However, there are deviations also in this basic scheme. In the Varnalii case, it is not reduced to a central polygon but two plateaus that are overlapped in the zone of the maple tree. In the case of Kojnik, the central polygon is the end of the series of spatial sequences of the wider street plan (Fig. 4).

The axial plans of the selected nodes demonstrate the deep structure of different geometries of convergence of axial lines. What can be noticed is that they never intersect at one point, but their intersections form a kind of a *thematic core* in the spatial system of the node to which the individual maple trees belong (Fig. 4).

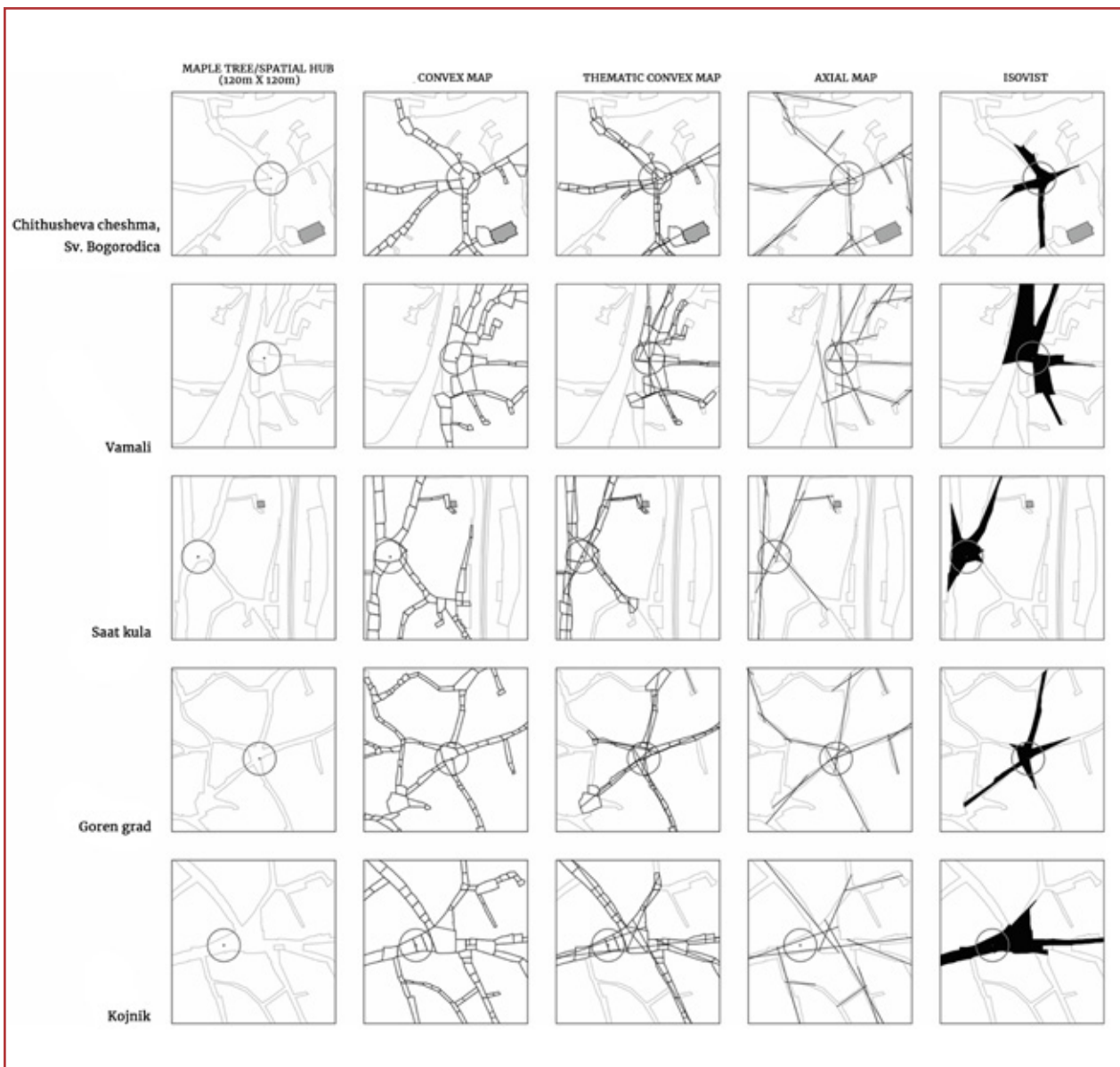
The comparison of the *isovists* of different nodes points to the immediate visual fields from the vantage point at the position of the maple trees. The visual fields represent figures of multi-point stars with different extensions of arms in respect to the character of the surrounding environment (Fig. 4).

The values of the number of axial lines, the number of convex spaces and the surface of the central convex polygon point out the quantitative spatial occupation of the particular spatial nodes. The centers themselves, i.e., the central polygon, are relatively small, while on the other hand, there is an extensive spatial system that they support (Fig 3). It is exactly this feature that relatively small spatial sequences have extensive effect upon the spatial environment that underlines the extension of the investigation into the relationship between individual trees and specific town sequences.

Fig. 3
Quantitative structure of spatial nodes.

Spatial node (120m x120m)	Number of axes	Number of convex spaces	Area of the central polygon
Holy Mother of God	6	36	114.4M2
Varnalii	8	27	298M2/290M2
Upper Town	5	33	106.2M2
Kojnik	6	55	312.5M2
Clock tower	7	26	280M2

Fig.4
The five individual trees / spatial nodes (120m X 120m) through four morphological representations: Convex map, Thematic convex map, Axial map, Isovist.



If we have so far perceived the individual localities and their relationships through 120m x120m sections, we will perceive their behavior at city level in correlation with a larger city section of 860m x 860m. The axial plans of individual localities superposed on a wider city basis point to integration with the context (Fig.

5). These are local places, neighbourhood centres, but also global points in the spatial structure of the city. In the same way, the isovists constructed of individual monumental trees, maple trees, point to their penetration into the surrounding environment (Fig. 6). These are local and global city phenomena at the same time.

Fig.5

Local axial maps of selected spatial nodes in the wider city context. Axial lines penetrate from the primary spatial frames in the surrounding environment: Chitkusheva fountain / The Holy Mother of God (1), Varnali (2), The Upper Town (3), Kojnik (4), Clock Tower (5).



A question arises as to what does this analysis exactly point out? Are the selected localities, spatial nodes, only foci, centers of the open spatial system? Is the convergence of axial lines unidirectional and/or does concentration simultaneously point to decentering, the inverse state of space? In the same way the isovist is constructed from the vantage point at the position of individual

monumental trees, we can understand the scattering character of space. What if these nodes are seen as concentration of routes toward monumental trees or centers of nodes, but simultaneously also as their scattering, opening toward the surrounding environment as something similar to the perspective structure of the inverse perspective.

Fig.6

Local isovists constructed from the point of view of the position of the individual trees in the selected spatial nodes in the wider city context: Chitkusheva fountain / Sv. The Mother of God (1), Varnali (2), Upper Town (3), Kojnik (4), Clock Tower (5).

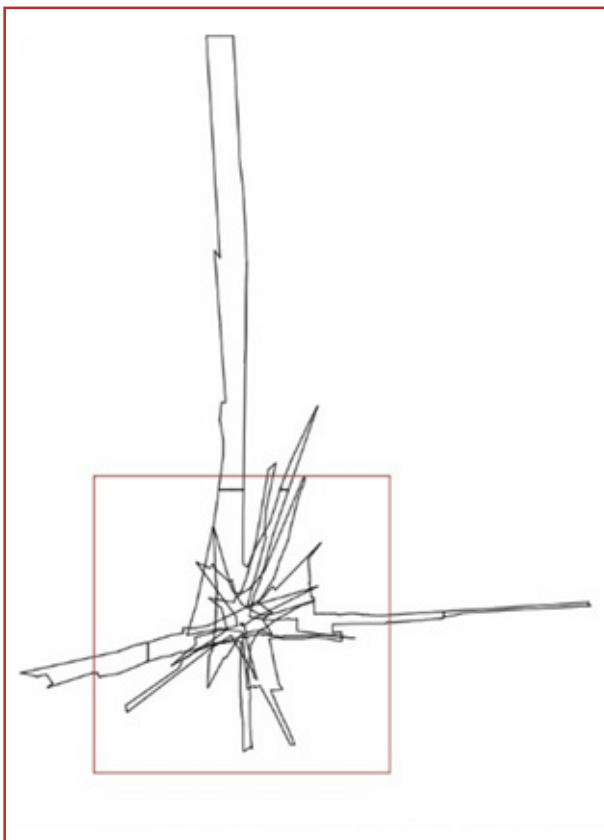


In the case of the inverse perspective, the geometrical eye point is situated in the observed space so that the parallels converge toward it (Stojakovic, 1970; Florensky, 1920). With the inverse perspective structure, one obtains a network of rays directed from the image toward the interior of space, from the presented environment toward the observer, fitting into the conceptual centre of gravity or the conceptual centers of gravity of the image. Instead of converging toward the horizon as in the linear perspective, the lines diverge toward it (Fig.7). In that sense, these places of monumental trees, maple trees, can have a dual character, namely, they can be urban places, centers, but also places of inverse urban-

ism - points where the city gathers and overturns, points where the city can be connected with the primordial natural basis of the monumental trees. Therefore, the urban systems and the natural basis should not be seen as separate contradictions, but as an ambivalent state of possible natural and urban synthesis. In that case, the position of the monumental trees is a method of a dual nature, part of the urban life, but also places of the type of Axis Mundi that are opened toward both the city and the nature, scattered through the environment. They are a system of cohesion of the urban texture, but at the same time, places of adhesion of the urban, cracks toward the natural ground (Fig.7).

Fig. 7.

Superposition of the isotovists of the five spatial nodes in relation to the position of the individual tree and the primary frame of 120m X 120m.; Analysis of the inverse perspective of the icon St. Andrey Rubliov (1410). The Holy Trinity. (Bakalchev & Hadzi Pulija, 2004).



CONCLUSION

The global urban reality of the contemporary *endless city* has brought us again to the elementary question about the relationship between the natural and the artificial. On one hand, the endless city is increasingly perceived as a quantitative construct of different program sectors, while on the other hand, there are increasingly less specific places of the elementary relationship of man with nature. This research has started exactly from these suppressed, marginalized, but unique specific places of dialog between man and nature as resistance level of the city.

Through the example of seven maple trees in Veles, we have perceived the complex and contradictory function of the individual trees and specific places in the city. These places are spatial, social and program foci of the city on one hand, but on the other hand, they are

places of opening, disappearance, release of the phenomenal nature in the city. Through the morphological analysis of the three principled levels, the convex map, and the axial map as well as analysis of the visual fields constructed from the position of the individual trees, we have perceived the typological and syntactic properties of the selected urban nodes. However, what is indicated by the isovists and the axial maps of individual nodes perceived at the level of the city, is their ambivalence, dual nature. Analogously to the model of inverse perspective, these nodes with individual trees become *conceptual themes* of convergence of street routes, as a kind of opening of the city and transcending of the physical structure of the city. It is the dual nature of concentration/decentering of space that overlaps the most intensive experience of the city with the deepest experience of nature in the dialogue between the man, the tree and the city.

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