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Research Article

Removal of Building Residence Area with Complex Number Approach in Free Building Identity Zoning Plots

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Abstract:

The zoning blocks in the free building order are the special case of the separate, block and adjacent building regulations in the implementation zoning plans. Buildings are established in order to meet human needs in areas within the zoning boundaries by giving such building regulations. Free-order zoning parcels are another type of mostly separate and block orders. In areas where such parcels are located, only the equivalent value, which is the total construction area of the island, is usually given. Based on this precedent value, the residential area of the building is given to the parcel with various methods or approaches in accordance with the relevant law and regulation. With the complex (complex) number approach of the sample plan representations in the study, it was tried to find the tensile measures with the help of the angle, based on the direction with a certain edge. The complex approach, on the other hand, is the process of subtracting the base area on a parcel basis in a certain coordinate system axially depending on the angle and distance parameters along the Y-X axes. In this way, the necessity of giving residential areas to zoning parcels with different identities was examined.

1. Introduction

Since social life necessitates a certain order (organization) in every respect, there is a need for rules that will ensure order in every society, from the most primitive to the most advanced. As a matter of fact, various rules have been foreseen for private and public activities in society in every age. For example, in every subject such as shelter, nutrition, entertainment, work; In this sense, simple or advanced rules and regulations have been made regarding almost every human activity of economic, social and cultural nature [1]. At this point, various rules regarding settlement and construction on "soil" (supply / land and land) and regulations on zoning have been encountered for a long time [2,3]. In other words, efforts to keep settlements in order are not new [4,5]. At the point reached today, although there are different approaches to zoning and planning [6], since it does not seem possible to think of regular urbanization independently of planning, zoning planning and the basic instrument of this activity, zoning plans, with the rules brought about settlement and construction on the land, the zoning order has been determined. It can be said that it has reached the level of the main determinant [1]. Planning, as a word, is the process that regulates the order of the elements of actions directed to a certain purpose in time and their distribution in space [7]. The act of planning can be classified as economic planning, social planning, and physical planning [8]. For example, the authority to take decisions on the plans prepared in the areas within the limits of the duties, powers and responsibilities of the municipalities has been given to the municipal council, which is the general decision-making body that comes into power [7]. The fact that the municipal council has the last word in the development plans is due to the close and intense relationship of planning with fundamental rights and freedoms. It is a correct approach in terms of a democratic management approach and positive in terms of the participatory structure of planning that the development planning studies, which have the ability to create intense pressure on fundamental rights and freedoms, are decided by the city council, which was formed by the people who are the owners of these rights and freedoms [9]. In fact, zoning plans are a complex type of operation that includes both general rules

and a diagram showing the application of these rules regarding the region they cover [7]. Although the subordination of the plans to the regulatory regime with the dominant view in the jurisprudence and doctrine stems from the expression of the zoning principles and rules in a particular
region at the level of abstraction possible, it is also based on the reason that this solution has practical results [10]. Another important phase of city plans that should be emphasized at this stage is the research and analysis phase. Today, it is accepted that urban planning is no longer a static concept and is a work that has to keep up with rapid changes [11].

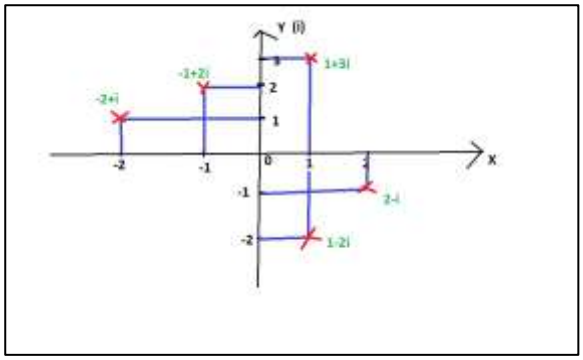

Figure 1. *Representation of Complex Plane and Complex Numbers [12].*

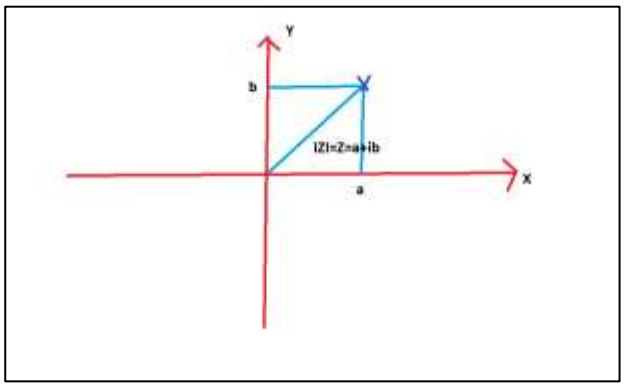

Figure 2. *Module of Complex Number [12].*

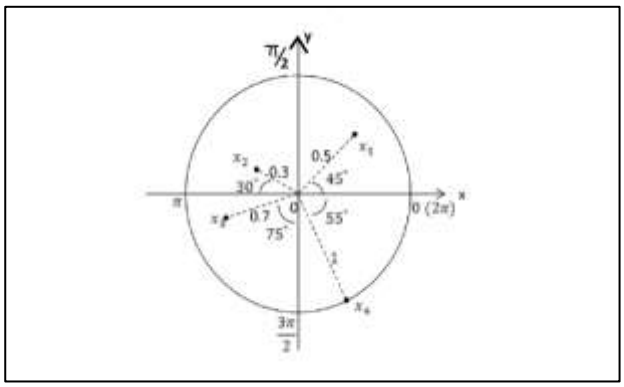

Figure 3*. Complex Fuzzy Set [12]*

2. Material and Methods

Since the plots are closed convex shapes, they have a plane area. Y and X coordinates from the junction points of both sides are found in a certain transformation system and their place is found in the geoid plane. If we show the plane mathematically here;
In Figure 1, it is seen how the convex long and short sides come together in the Y and X planes. Here, the real numbers on the Y-axis are called i when they are represented as a complex expression. The x-axis continues as real numbers
forever. From this point of view, the complex number z=a+ib can be represented as an ordered pair (a, b) [12]. The plane formed by taking the x-axis as the real axis and the y-axis as the imaginary axis is called the complex plane [12].

In Figure 2., it is seen that the distance will be calculated by pythagoras from the vertical feet and vertical lengths in the form of IZI=Z=a+ib in the Y—X plane. Given the complex number

Z=a+ib, the positive real number IZI=$\sqrt{a^2+b^2}$ is called the modulus or absolute value of the complex number zz [12].

In Figure 3., the determination of the fracture points of the parcels and the distance to the base can be calculated by means of clockwise or counterclockwise angles [12]. The aim is to determine the distance-based area and localization process from a 100 grad fixed point [13].

3. Results and Discussions

Free order parcels are the islands created by the planner as an identity open to interpretation in the zoning diameter determination processes called zoning status in the zoning plans. In these islands, especially the side and rear pull dimensions are tried to be given within the legal framework, as in the split and block types[14]. In some islands, the equivalent value may be given, and in some it may not. For those whose precedent value is not given, the process is continued by looking at the zoning islands around the relevant island. Side and rear pull measurements can be applied, such as islands with a height legend [15]. According to the regulation, the average TAKS (Base Area Coefficient) can be taken as 0.30 for those whose peer value is given, and the number of floors they correspond to can be found by making Precedent/TAKS [16].

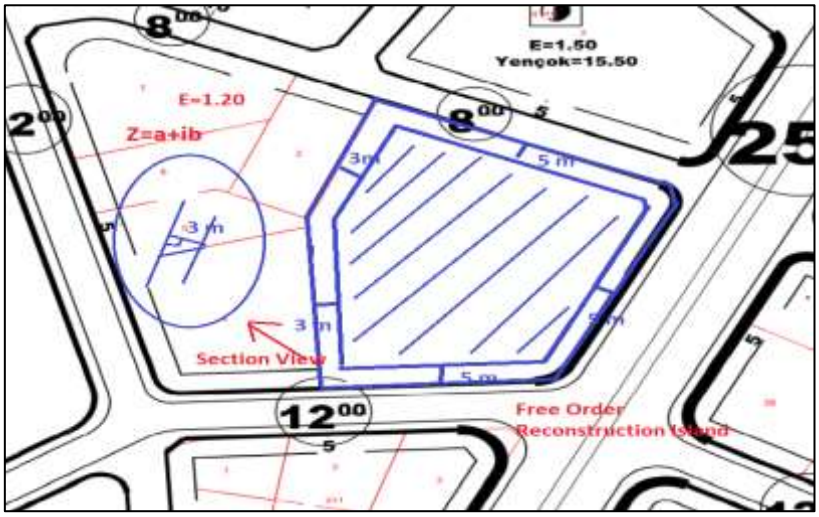

Figure 4. *A Cross-Section View of a Free Order Plot with Peer Value*

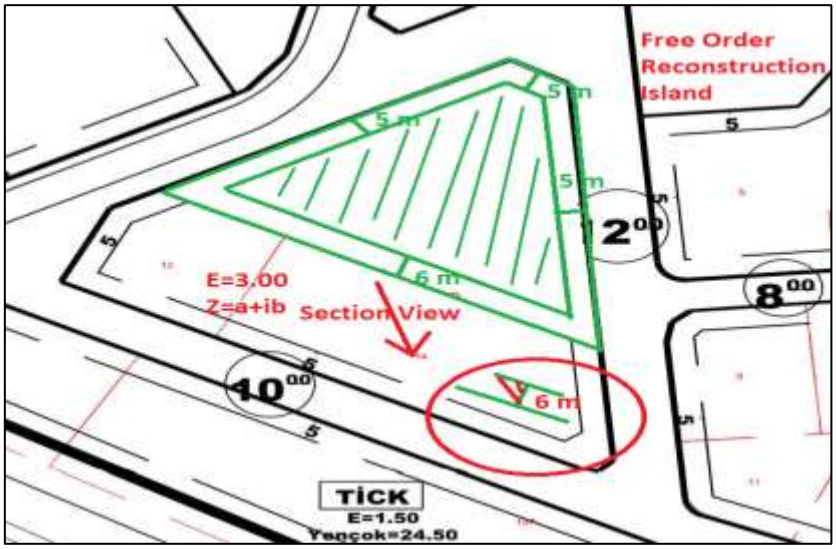

Figure 5. *Side Measurement Cross-section View of a Free Ordinary Plot*

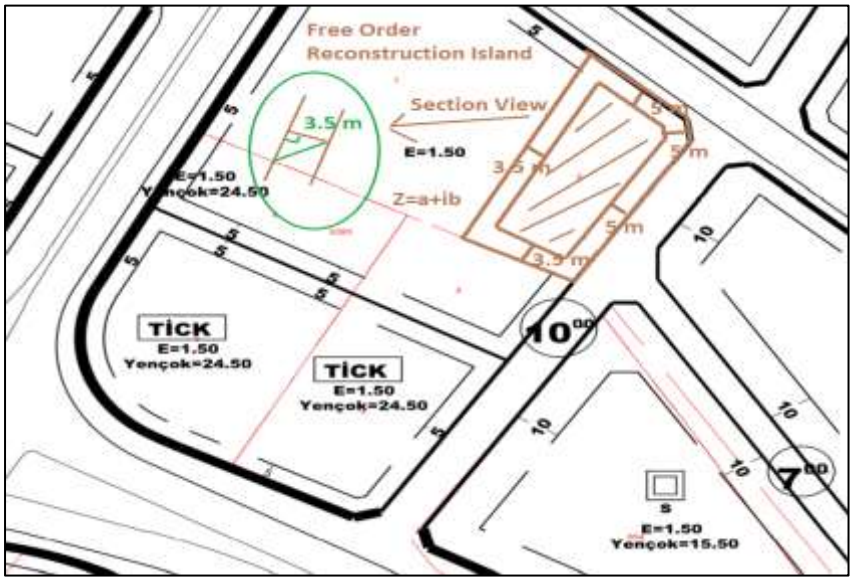

Figure 6. *Side Measurement Cross-section View of a Free Ordinary Plot*

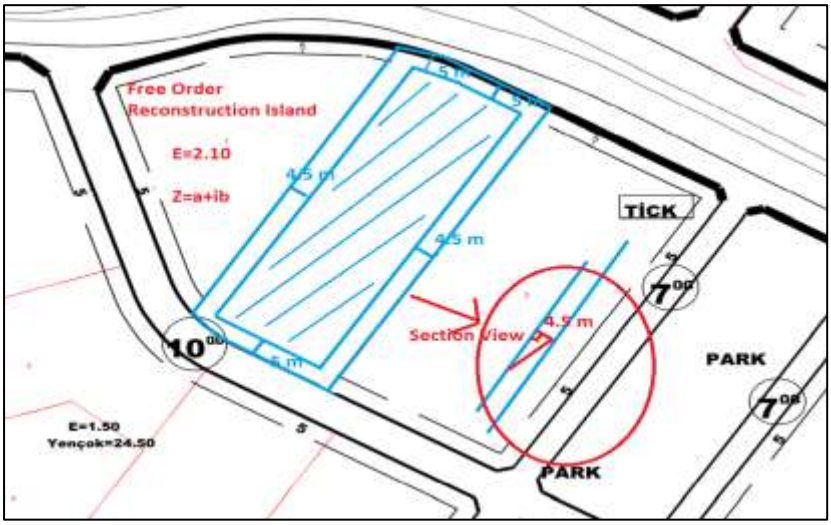

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Figure 7. *Side Measurement 2.10 Section View of a Free Order Plot*

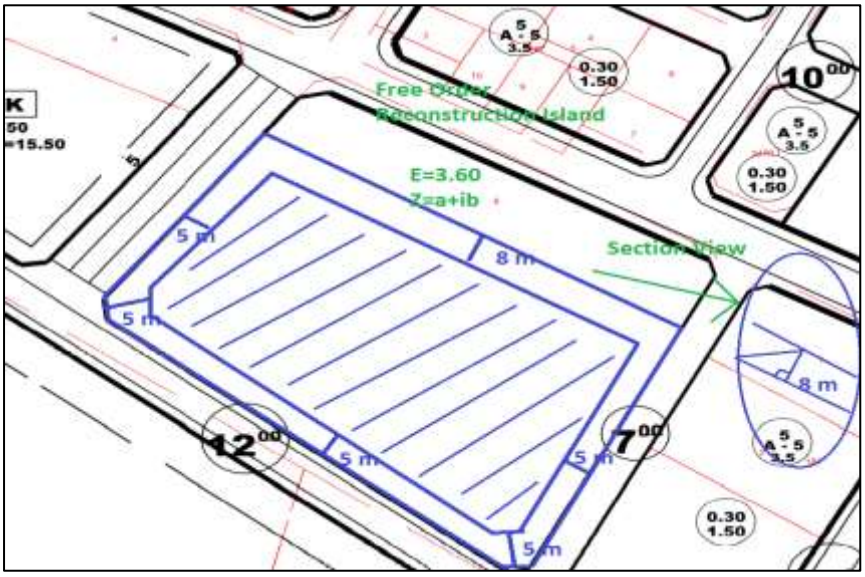

Figure 8. *Side Measurement 3.60 Section View of a Free Ordinary Plot*

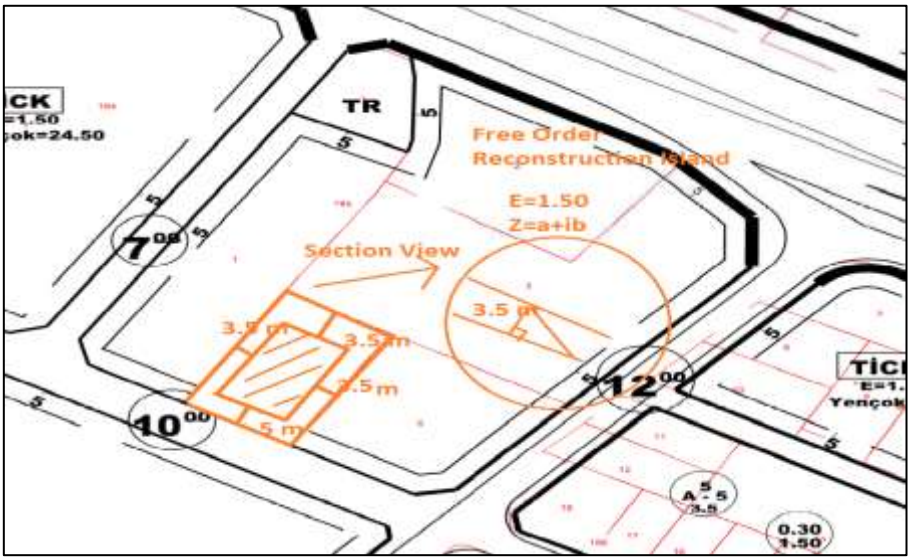

Figure 9. *Side and Back Measurement 1.50 Section View of a Free Order Plot*

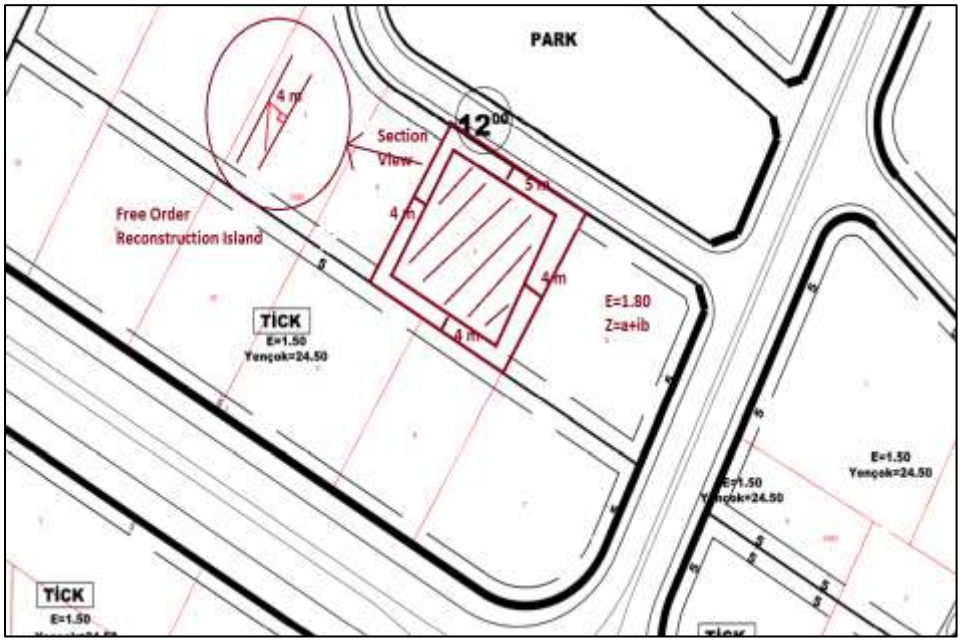

Figure 10. *Side and Back Measurement 1.80 Section View of a Free Order Plot*

If the whole surrounding is in the form of free order, the dimensions can be determined by taking a certain number of floors. The zoning parcel in Figure 4 is a large parcel in terms of area and has three sides facing the zoning roads. In this respect, it is calculated how the building will fit on the parcel in such islands. Although it is a free island, the total construction area is given. According to the planned type zoning regulation of this zoning island, which was written as 1.20 in the plan, it was noted that the average floor usage amount per floor is 0.30 [16]. From this account with an average of 0.30;

It can be found from

Equivalent Value=Total Construction Value/0.30 [17].

Since one side of this zoning parcel is bordered by the neighboring parcel, it will be drawn as 3 meters from the phrase that the side measurement will be pulled back at least 3 meters in places up to 4 floors. If there is no construction on empty plots, the front distance will be fixed 5 meters [18]. It is calculated as $Z=\sqrt{a^2+b^2}$ since the outer edge a and the inner edge ib are taken as basis in the Y-X plane from the side measurement section.

In Figure 5., the related zoning parcel will be given back to back at a single depth point, although the island is completely composed of 2 parcels, even though it is free order. As for the settlement of the building, since there is no construction on the island, a measurement of 5 meters will be made from the parts facing the road, and it will be understood that the side measurement should be made from the side, again due to the total maximum value of 3.00, which corresponds to 10 times the average equivalent. In the same way from the side section view, the edge can be determined as $Z=\sqrt{a^2+b^2}$ from the outside to the inside.

The immovable in Figure 6 is a zoning parcel located at the corner. From this point of view, since it is a point with a precedent value, 5 meters will be measured from the double-sided fixed road sections, while the side measurements will be evaluated as a point corresponding to 5 floors, and the base sitting area will be determined on the Y-X axes with 3.5 meters of drawing. The parcel in Figure 7 is the zoning parcel facing the double road in the north and south directions of the island. Since a total construction area of 2.10 will be used here, distance measurements will be made, corresponding to an average of 7 floors. The total construction area is;

*Total floor areas = Land area * Equivalent Value* [16].

Since the parts corresponding to 7 floors are side, there will be a half-meter increase per floor that is more than 4 floors, and it will be measured as 4.5 meters. It is shown from the side section view that this measurement is based on the edge from the coordinates and its availability with the help of angle. From the plan view in Figure 8., it will be deduced from our previous determinations that it corresponds to 12 floors. Since there are more than 4 floors in this parcel, which has a uniform geometric closed shape, measurement will be made from the side in the form of 8 meters, with an increase of half a meter per floor. From this point of view, the difference between $Z=\sqrt{a^2+b^2}$ can be calculated by descending 100 grads from Z=a+ib to

outer edge a to inner edge b from the 8-meter cross-section view [17]. The parcel in Figure 9. is a single-sided development parcel. Therefore, the place to stay behind is called the back area. The measurements found here, on the other hand, are evaluated as the distance to the back in line with the regulation that changed in 2017, and applications are made based on the note in the form of at least 3 meters [16]. In the image, it will be seen that the side and rear distances will be 3.5 meters when the calculation is made over 5 floors according to the 1.50 calculation in a parcel with a free building identity. It will be able to be calculated as a complex in the application process on the angle and edge bases from the outside to the inside. In Figure 10, an example is given from the parcels that are in free order, especially for the rear measurement to be certain. While determining the floor area of these parcels with a regular shape, it is seen that since the north of the island has a value of 1.80, it will correspond to 6 floors. From this point of view, the distances will be found from Z as 4 meters in the form of side and back.

4. Conclusions

In the analysis of which parameters the residential area of the building is given in the freely regulated zoning islands, these conditions have been tried to be explained with examples. According to the limits of the relevant regulation, the parcel floor was examined as a plane as a geometric approach and the distance measurements were shown. With the complex approach, plot structure base extraction is explained by considering some edges as bases and complex constants. It has been observed that in free regulations, especially on samples with known precedent values have been studied. In the absence of such sharp identification information in free orders, side and rear distance measurements should be made based on the observation of how the buildings were given in the surrounding islands, or the side and rear measurements should be determined according to a certain floor height and given below according to the following floor, the application of tension should be deducted accordingly in the increase or decrease of floors.

Author Statements:

- **Ethical approval:** The conducted research is not related to either human or animal use.
- **Conflict of interest:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper
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- **Data availability statement:** The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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