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Climatic Feedback and Geomorphology in Urban Development Planning: A Case Study of Shiraz Metropolis, Iran

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ABSTRACT

Managers and planners of urban development logically arrange human and natural applications in a set of systems. Interaction between subsystems in a desirable way can result in high positive entropy and consequent modern urban development. This study investigates whether the dynamics of physical development in Shiraz, Iran, follows a chaotic standard or not? The first step in this regard is to apply a systemic attitude. The second step is to quantitatively define each of the systems (climatic, geomorphological, humanistic). To that end, the required information is extracted as an approximation from the thirty-year climate products of the Meteorological Organization of the province, and the information needed in the Shiraz area is determined through internal interpolation.

By extraction of two-dimensional planes and three-dimensional pixels (topographic and geomorphic), spatial information is computed. The two-dimensional data of physical development of Shiraz city as a human system have been developed for the whole province and the city of Shiraz and then quantitatively expressed through internal interpolation.

Given the geometric spatial arrangement of numerical information and the algebraic analysis of systems, it can be seen from their systematic feedback due to the structure of chaotic, fractal or phase and the interaction of natural and human systems that it was designed to manage the urban development of Shiraz which as the whole system has the least negative entropy in other fields of material and energy flow and the highest limit of negative system feedback. Results of analysis, on the one hand, show the imbalance in the dynamical system of urban *geomorphology, and control of the system towards equilibrium, on the other hand.*

Keywords: *Geomorphic, chaos, fractal, Physical Development, climate change, Shiraz.*

STATEMENT OF PROBLEM

The process of urban development, as one of the subsystems of economic development, depends on geomorphologic structures (writing, 47:1383) and climatic elements, especially in the genesis of creating Gramanious islands in cities (Ranjbar, 106:1384). In addition to creating a human sociological homogeneous context, it can be completely flexible against geochemical algebra. This algebraic flexibility will completely lead to the management of potential and actual reactions of the civilian body of the city in dealing with natural hazards. On the other hand, urban space development will be fully controlled by reverse engineering technical principles in the context of geomorphology and climate.

This process will lead to more precise results in autonomous studies in a systematic modeling scenario. One of the most unique independent Zagros basins in the southwest that maintains its hydro geochemical independence considering the two levels of Persian Gulf and central plains of Iranis the Maharlou hydrochemistry basin(Zomarodian.38:1391). This basin is located in the northern part of the political area of Shiraz and its southern part is the political platform of the city of Sarvestan. This basin comprises Shiraz which is developing its vital area, and has an area of 3931 square kilometers and a periphery of 382 kilometers along the east from 52 degrees 13 minutes and 16 seconds to 53 degrees,28 minutes 59 seconds and north latitude from 29 degrees 15 minutes to 29 degrees 55 minutes and 59 degrees. The city of Shiraz, with an approximate area of 180 square kilometers, is located in the Maharloo geomorphic basin which is based on the Maharlou lake. The city of Shiraz has the potential for physical expansion in an area of 800 square kilometers.

This development of urban space is indisputable but must be done by applying scientific approaches to the management of this spaceso as not to cause natural and human problems. The Maharlu geomorphic basin with the center of the city of Shiraz is expanding its living space. This study should answer the following important question: Is the physical development trend of the city of Shiraz on the basis of geomorphology of the basin from the climatic variation algorithm? Considering that the geomorphic basin of Maharloo has been formed as a context for the development of the city of Shiraz in the form of Jurassic roughness's, especially in a synclinal valley, and in terms of structural and morph tectonic geomorphology and morph climatic conditions, it is also a story of the fate of Zagros. As the skeleton and rugged structure of this basin are composed of three geomorphologic mountainous units, the flat and pitched surfaces of the lake tectonic formed and evolved during geological periods under the influence of tectonic climatological and hydro geomorphologic processes. (previous 49). Consequently, considering the issue of this research & nabs; it is possible to formulate two hypotheses for explaining the governing pattern of climate change in the Maharlou basin:

a) The climate change of the geomorphic basin of Shiraz follows the chaos algebraic algorithm.
b) The pattern of climate change in Shiraz follows the fractal algorithm.

The assumptions in urban planning routines of Shiraz can be described by algebraic structures with a linear or nonlinear basis to manage urban space development. The scientific and practical experience from dynamic analysis suggests that dynamic combinations of both human and natural systems and the phenomena arising from the interaction of these two poles are more compatible with non-linear algebraic processes.

In other words, the physical development of the city of Shiraz can be composed of components and each of these & NBSP; components can follow an algebraic structure. The general trend of ascending or descending dynamics of the composition of the dynamic process outcomes of the system components will be calculated. Each component can adhere to linear or nonlinear algebraic structures (fractal, fuzzy, chaos, simplex, complex, holomorphic and monomorphic).

Research Background

Researches have been carried out (Azaranfar et al.2006) that have evaluated the effect of climate change on rainfall and temperature in the Zayandehrood basin using the general rotation of the atmosphere. ElahiGol et al. (2006) examined the effect of temperature and precipitation changes on the runoff of Amameh basin (Tehran province). Modeling the Iranian climate for the period of 2010-2039 (Babaeean et al.2007) using a finer scale of statistical exponentiation, results from the GH ECHO model were obtained using the quantitative statistical scale of the output of the ECHO model. Jihadi Targhi et al. (1999) determined the trend of temperature and precipitation changes in Mashhad during the period of 1951-1999. Sadat Ashofteh (2007) entitled climate change impact on the severity and frequency of floods in the time of specific returns. Talebi (2002) provided an overview of the effects of climate change on glaciers (Asakereh, 2003), global temperature changes during the past century (Montazeri, 2003), and water resources of the country. Studies (Agricultural Planning and Economics Research Institute 2005) examined the predictions of global climate models and determined the appropriate model for the region and Iran. This study investigates the cybernetics geochemistry of Shiraz in interaction with urban development planning from the point of view of inductive analysis.

One of the most important predecessors of such combined statistical peer analyzes is the argument (Briggs, 1992) (as the pioneer of this inductive analysis applied to the application of chaos logic) of systemic chaos (and its equivalence with fractal or strange hold logic). In this area of science, we must refer to the use of logic of chaos in the topology explanation of Mandelbrot (2004). Falconer (2003) interprets the absolute geometric and algebraic coordinates of strange hold logic so that it can be used in other computations in system structures. Using the same rules, Arabacioglu (2010) was able to use fuzzy logic for analysis of building structures for the first time but prior to the practical application of fuzzy logic in these structures. the emphasis (2002 , NBSP; Biacino) on the effects of fuzzy logic function in these systematic researches should be mentioned.

With all the expressions that have been scientifically analyzed in the last three decades in the field of geosciences, in Iran the first use of the system of cybernetics was introduced by Ramesht (2002). He also explained the role of fuzzy logic in explaining the geochemistry processes (Ramesht, 1999). It is worth mentioning that the use of the concept of chaos in cybernetic calculations in climate and geomorphologic interpretations was first published by Ramesht in 1382 in the field of geographic sciences in the country.

In Fars province, the geomorphic basin of Fasa (Hashemi, 2010) was investigated from a systematic point of view. The course of climatic developments in this basin was also explained (Hashemi, 2011).

THEORETICAL

Applications of nonlinear structures in a systemic way after World War II found their scientific routine in combined research. The system view was not specific to a scientific field and can be calculated in other branches of natural and human sciences. Since the present discussion is a systematic analogy that consists of natural and human components, one can use chaotic, strangehold, fuzzy and even linear analyzes to explain the rules governing the system logic of the discussion. In many cases, research projects are examined only in terms of quantitative aspects. In fact, what is the main essence of climate and geomorphology and its cybernetics with urban development planning is the nature of nonlinear algebra of these natural factors which until a few decades ago considered the world as a set of systems that are moving in a completely obvious and predictable manner in accordance with Newtonian algebraic laws of nature. But with the advancement of science, many of the natural events were no longer justified by Newtonian algebraic view. The attempts to describe such events resulted in nonlinear algebraic theory of specific and general relativity (Einstein & APOS; Sor for example, chaos theory in quantitative analyzes (Vellekoop, 1994,). Chaos Theory or approach of chaos, studies the chaotic dynamic systems; chaotic systems are nonlinear dynamical systems that are very sensitive to their initial conditions and a slight change in the initial conditions of such systems will cause much change in the future. In other words, they follow a homogeneous algebraic structure.

This phenomenon is famous for the butterfly effect in the chaos theory. The behavior of the chaotic systems seems to be random. However, there is no necessity for the existence of a random element to create chaotic behavior and certain dynamic systems can also exhibit agitated behavior. It can be shown that the condition for the existence of chaotic behavior in dynamic systems is the effect of another element as the third dimensional state variable (third order system). Lorentz & APOS; Sdynamics is an example of such a system (Kellert, 1993). Consider a simple atmospheric system in Fars. The function is to estimate tomorrow & APOS; S temperature from today& APOS; S temperature. The orbit of a point under a function is a set of events that occur as a result of the repetition of the (dynamic) function at that point. The other idea is a similar or disjoint structure which was originally developed by Elibnites and even solved in detail. In 1872 Carl Weierstrass found an example of a function with non-pointing properties that were joined everywhere but it was not indifferent at any point in the curve. The graph of this function is now called unblocking. In 1960, BenoitMandelbert researched self-identification in an article titled " what is the length of the shore of the British coast ". These were based on Richardson & APOS; Searlier work. In 1975, Mandelbert was able to determine the algebraic structure that would be vague from a point to the negative and positive which later Biskovich interpreted it as a topological dimension and invented the word & QUOT ; fractal & QUOT;

He described this mathematical definition through a particular computer simulation (1992, Briggs.) The contradictions in the method were divided into non-linear algebra disruptions and probability distribution (exponential algebra structure). On the other hand, disruptions are self-assertive or arbitrary. In self-assertive, the shape of the component has a remarkable similarity to the whole shape. This component grows steadily in all directions and generates the whole. But in the self- arbitrary, the shape of the component does not grow steadily in all directions. As ANN, example of rivers and catchment areas, the length of strange hold dimension is different from the width of strange hold dimension. Hence, the shape of the catchment area is larger than the basins within the basins. So, fractal explores the geochemistry chaos systems. It can be stated that geochemistry systems are strange hold and nonlinear dynamical systems that are very sensitive to their initial conditions (figure number 1).

In these systems, the orbit of a point under a function is a set of events that occur when the function is repeated for that point. For example, the orbit of point 1 under our function is that 1 first, then 3, 5 becomes 7 and so on. Consider now f(x)=x^2 +3.

1) *F(x)=X^2 + 3*

2) *F(x)=x+2*

3) *f(n)=f(n)^2+c*

4) *f(n)=f(n)*f(n)+c*

5) $T=(e^{0.991})M^{0.538}$

6) $Rh=e^{(0.462*(Ln38.462Fc))}$

7) $P=955.477e^{-0.000326H}$

8) $H=(1.455*10^{-36})e^{0.0841P}$

9) $t=e^{\left(\frac{\text{Ln}\left(\frac{A}{0.951}\right)}{0.838)}\right)}$

10) *Y=((1+(1/z) ^z) ^x*

11) *Ln(Y)=(x)Ln(1+(1/z)) ^z*

12) *Y=e^(x)*

A slight change in the initial conditions of such systems will make a lot of change in the future. For example, the function & QUOT; F(x)= x+2 " is assumed to estimate tomorrow &APOS; S temperature from today & APOS; S temperature.

This function disrupts us into the world. It seems that the orbits of all points are infinitely desired (Falconer, 2003) It should be noted that the endpoints of each field are fixed on this function.

By executing the function and continuing it, we see that all the points within the interval are infinitely desired but the range of the interval is still finite. This behavior is a strange hold behavior. Fractal shapes are usually generated using recursive functions. An example of the recursive function c) n (f) * n (f) = n (f or c 2) ^ n (f) = n (f) is a fractal function in this equation c which is a complex number (containing an imaginary number) that can be any value and the result is a different Julia set. n is replaced by the point coordinates. In this fractional orbital structure, the orbit returns to a point or between two points but with a diminution to the infinitely positive or negative, it becomes vague (Briggs, 1992).

RESEARCH METHODOLOGY

In the first research period, using the library method, the climate statistics of the Shiraz basin and adjacent basins were extracted from the Meteorological Organization site. The climatic information in the basins around Shiraz was extracted from the synoptic stations located in the political zone of Fars province, for this reason, the statistics of thirty years of all stations located in the basins surrounding Shiraz basin were first collected. In the second stage, geomorphic field observations of Shiraz basin were made. This information was derived from two methods. In the first method, using field observations, geomorphologic information via GPS Garmin was digitally transferred to a set of GoldenSoftWare11 Geographic Information System. In the second method, using topographic maps 50000.1 and 250.000.1, digitizing the elevation and slope of the geomorphic basin of Shiraz was carried out. In the third step, from digital data, the essential outputs were extracted in the inductive structure as well as in the deductive structure by applying the kriging system. In the fourth step, the initial outputs were digitized again to passthe information. In the fifth stage, by referring to Pythagorean algebraic proportions (Hosseini, 2003), a description of climatic characteristics and their evaluation and analysis were studied and then by establishing a criterion between inputs and outputs of the climatic, geomorphological, and human factors, the basin of non-linear criteria governing the basin system was shown as a guide of urban planners and urban development managers in Shiraz.

The variables used in the research were based on the need for synoptic information, geomorphological and physical development structure of the civil area of Shiraz which was analyzed based on the complexity quantitative index of nonlinear algebraic structures.

Research Findings

The context, in which Shiraz is located, was been defined as a system. Although this overall system had hundreds of subsystems, however, three effective main sub-systems in planning urban development in the Shiraz area based on the basin and hydro geomorphic basin were studied.

These sub-systems are:

I) Hydro geomorphological subsystem of Shiraz basin and its dominant indexes

II) Climatic profiles governing Shiraz basin sub-system

III) Dominant structure of physical development in Shiraz.

Hydro geomorphological subsystem of Shiraz basin and its dominant indexes:

In the management of physical development in Shiraz, first of all, there should be a commentary on the surface geomorphologic features of the city that has been deployed so that its potential capabilities can be practically applied to urban development planning of Shiraz. In terms of hydro geomorphology, Shiraz basin has 7.1 degrees of floodgate in a Gravalous scale. The classical length of the basin is 167 and its width is 23 kilometers. This basin elongation is a confirmation of the actual performance of the flood flow factor in Shiraz basin. Because whatever the coefficient is closer to 1, the floodgate is high and whatever it is closer to 3, the floodgate is low. Geomorphic findings indicate that two thousand square kilometers of the basin are 1980 meter & NBSP; higher above sea level and by interpretation of the dimensionless curve of the basin, it is induced that half of the area of the basin with a height of more than 1900 meters is located at the geological maturity stage. According to the integral coefficient of elevation (5.0), more than half of the area of basin is located in the geological age stage which reflects that the basin has a moderate tectonic factor. The geomorphic basin of Shiraz has revealed a particular gradient due to its specific topology structure. In other words, the slope can be divided into three parts in the basin:

First, the basic level of the basin with a height difference of 1445 m is at the level of the Maharlo Fall. Second: slope in Shiraz plain. The plain on which Shiraz is located is not more than 150 meters in height with the algebraic basic level of the Maharlou basin. This height difference has caused the dry river which is the most important hydrologic artery in the basin to flow to Maharlu and flow from this plain to the surface base of the basin. Third: Sarvestan plain.

  whose slopes are from south to north. It means that the slopes are from the hill to the surface of Maharlu basin and drains south of the basin.

Climatic Profiles Governing Shiraz Basin Sub-System

The most important climatic profiles of the basin located in Shiraz are temperature, precipitation, pressure, and humidity profiles. From the point of view of temperature, the physical structure governing the energy changes received from the Shiraz basin follows the & NBSP; Chaos trend. Figure2.

The standard is the trend in which T is the average monthly temperature of the Shiraz basin in degrees C and M is the number of months from the studied years. In the above function, if the tempo of temperature is to be considered in the month then the chaos structure of the temperature will be completely calculated by calculating the rotation M. This is while the dominant structure on changing the relative humidity has a strange hold trend in the Shiraz Basin.

In the interpretation of strange hold state of the relative humidity of the geomorphic basin of Shiraz, it should be stated that if the structure of the sentences calculated in the previous section, it was in a way that system inputs turn around a single time center. In this case, the cybernetic structure of the action and the reactions resulting from the changes and relative humidity fluctuations of the geomorphic basin of Shiraz have a chaotic function.

In this case, as in the case of temperature in the basin, the function moves around a central point. that is, if the input and output function of a climatic factor can move all the values from negative to positive infinity around a central point. Then, again, they digitalize them downward and upside down so that they do not become obscure, then the performance of that climatic element is chaotic. But if the function after the receipt of a structural rotation input leads them to infinitely positive climb and receives less input from it with A structural rotation, they will lead them to the downside to infinitely negative.

  then land managers and planners will face a stranglehold structure. This structure is calculated based on statistical analysis of thirty years in Shiraz basin where Rh is the relative humidity and Fc is the relative humidity compression of the Shiraz basin.

Of course, the structure of the motion is proportional to infinity but it will distance from the central point. So the outputs can be truly conceptualized before infinity but they will not be fully integrated in reality. In terms of disadvantages, the findings of the present article of the basin are in the range of 300 to 600 mm of isotypes, emphasizing that the boundary of the geomorphic basin of Shiraz is between 800 to 860 mill bars of isobar. According to the findings of this research, it is concluded that the best rule governing rainfall performance and atmospheric pressure on the basin adheres to the visual algebraic structure. In the order precipitation is calculated as input to the function and pressure as output from the function. The result of the algebraic cybernetic can be presented in a descriptive way. This criterion is the mean rainfall in the basin in cm and H is the pressure in terms of Hector-Pascal depending on the height of the station from the sea level. So, the pressure factor itself is a two-dimensional factor in which the role of the element of height is also included.

Based on this criterion, chaos pressure is calculated for the basin as 773 hp. By reversing this criterion, the chaos rainfall of the basin can also be calculated:

A Formula

Based on this criterion the chaos rainfall rate for Shiraz basin is less than 1 mm. Therefore, the chaos pressure of 773 Hecto-Pascal of the basin with a rainfall of less than 1 mm is the input and chaotic outlets are these two climatic elements in the basin. (figure number 3)

Dominant structure of physical development in Shiraz:

The first aerial image of the city of Shiraz dates back to 1330 solar years. Pictures of the years 1350, 1360, and 1380 are also available. These images became geographically metric in the geographic information system. In a way, the area of Shiraz in 1330 was 7.1 km2 which reached 15, 68 and 162 km2 in 1340, 1360 and 1380, respectively. This information shows that during 50 years, the city has been physically developing 96 times as much as the initial level of the city in 1330. Of course, the city of Shiraz will have physical development on the geomorphic basin of the area up to 300 square kilometers even with tectonic and topographic conditions up to 509 square kilometers but it should be clear what the physical structure of this structure adheres to.

  In the elaboration of algebraic complexity of this urban space, the occupied areas of Shiraz are selected as input variables over time. Then, criteria between the urban space and the length of time is determined. The ruling criterion for this space has been calculated over a 50-year period with a validity of up to 95% which is expressed as follows:

A Formula

In this function " t " is the commentator of the expression of time quantity and " A" urban space of Shiraz city which represents the state of chaotic changes and expansion of physical space of Shiraz city and is fixed in quantity 8.0. (table number1)

As mentioned in the previous sections, the algebraic findings follow the climate profiles of the Shiraz basin, temperature and precipitation also obeyed the chaos algebraic structure and relative humidity obeyed the strange hold structure. In any case, if the two-dimensional physical development space of the city of Shiraz is increased radially and then compressed on a chaotic scale, the yellow zone of figure 4 is devoted to this part. This range will potentially sustain the physical development of the Shiraz civil zone. Note that in Table.., the circle of each column represents the turning of two sequence rounds. so the turning circle (9) is in fact the sequence of 19 rounds of the chaotic circuit which if this sequence becomes eighty, the central point of the chaotic function will fix the two factors of time and physical development of the city of Shiraz, exactly on 0.8.

ANALYSIS OF RESEARCH FINDINGS

As the research finds, the process of rainfall changes, temperature and development of urban space in the studied area, the basin of the structure of chaos and the process of relative humidity changes of the basin obeyed the stranglehold structures. In all three cases, computations of complex algebraic logic were used. In this method, with a series of input information and their parallel series as outputs, in the formulation of functions, the change processes are described. In fact, the factor of time in each of the four calculations was considered as the input factor. With this logic, with the advent of time series, the researcher can touch the structure and process of changes in an inductive or even analogical manner. In all three structures, the logical process of x (^ z) ^ z / 1 (1 = ((Y)) was used to coordinate the domain of the changes in time inputs and climatic outputs and the physical development quantity of Shiraz where in it, each input or factor X was the same factor of time and factor Y ws the climatic output of the geomorphic basin of Shiraz or the level of urban development in Shiraz.

The Z output interval was varied from 1 to 2.718281. As the above statement shows in a reverse engineering, the elements Y and X can be replaced by z)) ^ z / 1 (1 (Ln) x) = (Y (Ln) and from that value (x ^ (e)).

In both of the above logic, the inputs and outputs are climatic which show themselves in interaction between two algebraic mechanisms and urban spatial development of Shiraz.

The first mechanism is the rotational structure between the inputs and the outputs of the complexly. In the second mechanism, in some trends, such as temperature trends, rainfall and urban space development, the process of changing is fixed at an algebraic point. The state mentioned is chaos state.

Of course, it should be noted that the quantity of orbits is different which is quite logical, while in some trends, such as relative humidity, the function of change in one or two algebraic points is zero and from this one or two algebras points, by the smallest limit of change, the function immediately tends to infinite positive or negative and in fact, this is fractal or strange hold state. Obviously, if a function similar to the relative humidity of the geomorphic basin of Shiraz is found at two fractal points then there is a chaotic state between these two points, while the two points have a strange hold state and even an epsilon from two zero & NBSP; vibrational points to the positive or negative of the function structure will lead to the relative humidity of the basin to infinitely positive or negative. Therefore, among the climatic elements of the geomorphic basin of Shiraz only the relative humidity element obeys the fractal structure. In this structure, the relative humidity function is balanced at a point and the deviation from the algebraic point causes the obscurity of the function to be obeyed. The dominance of this structure on elemental changes such as relative humidity means that this climatic element in the Shiraz basin tends to imbalance. In algebraic analyses, geochemistry data of the basin did not show any fuzzy function of climatic profiles.

It is the function of four-dimensional temperature and precipitation on the basin and its cybernetic with the & NBSP; strange hold structure of relative humidity and cybernetics of this function with geomorphology basin, causing a non-equilibrium from geomorphic basin of Shiraz to   the Kor basin and to the geomorphic basin of Fasa in Fars Province. This will of course be created in the event of a threshold around the energy and material bill. In this regard, the researchers should proceed to the trend of climatic fluctuations on the basin over the last two million years.

According to the results of geomorphologic and hydrological findings of Shiraz basin, the geonronous performance of the geophysical basin of Shiraz (even during the quaternary fluctuations) has prevented the reaching of the level of base of Shiraz basin to the thresholds that lead the basin to an imbalance. So, urban space development in Shiraz, with all aspects in planning urban development and crisis management from a hydro geomorphic point of view will not cause a natural imbalance in the Shiraz basin. Of course, it should be noted that there is a probability that the basin will be rooted in a non-equilibrium but this contradiction can be achieved by implementing risk-management or crisis management structures and by using controlled programming algebra.

CONCLUSIONS & AMP; SUGGESTIONS

  considering that any natural and human variables have their special systematic & NBSP; functions that can determine the rules governing how to change them. Thus, it would be logical that managers and planners use the rules governing the interaction of natural and human subsystems in Shiraz urban area and its cybernetic with geomorphology and climatic basin of Shiraz in preparatory field and identify rules governing the whole system, then provide & NBSP; techniques for land management to design and implementation regional development plans in urban areas of Shiraz.

In this article, the structures governing climate and physical development of Shiraz are calculated. According to the results, it is found that natural and human structures of the study area follow the chaotic and strange hold systems. Therefore, considering this structure governing the two natural and human limits of Shiraz, the following suggestions are made:

- Finding the trend of equilibrium changes and climatic fluctuations of geomorphic basin of Shiraz should be analyzed with complex functions.
- The cybernetic change trend and basin geo-phonetic fluctuations should be analyzed against the climatic inputs through two-way complexes functions.
- The quantitative coordinates of equilibrium and stability equilibrium of the geomorphologic basin of Shiraz are calculated from the performance of nonlinear simplexes and two-way complexes of xeromorphic distribution. Analyzing internal trends based on criteria (holomorphic criteria).
- Analyzing internal geomorphic of basin based on holomorphic criteria.
- At first, the quantitative changes and geochemical fluctuations of the geomorphic basin of Shiraz with the consideration of the cybernetic function of these factors are calculated inductively and deductively in statistical algebra. then the results obtained in the management of land systems in the Shiraz basin should not be used to cause fuzzy change in the dynamics of Shiraz basin.
- Given the dominant structure of the climatic chaos on the geomorphic basin, no plans for agricultural development plans will be planned for the long term,
- Considering the possibility of physical development of Shiraz and the chaotic performance of this space over time. If the baseline studies proposed in the first to sixth parts, the living space of Shiraz can be up to 600 squarer kilometers, provided that it meets the rational criteria of chaos.
- Due to the dominant chaotic and strange holder structures in the Shiraz Basin, it is suggested to emphasize the development of non-agricultural conversion industries.
- It is suggested that industrial agriculture be managed and planned in a chaotic way and in return limitation of rainfall threshold.

Obviously, in order to meet the needs of corn and other products required by the population living in the city limits of Shiraz and the whole basin, it should be taken out of the basin so that the present population does not suffer from the lack of water in terms of urban consumption.

- The development of the city of Shiraz to the south of Shiraz plain should be stopped and the northern, eastern and then western plains should be explored in the development of the use of urban land.

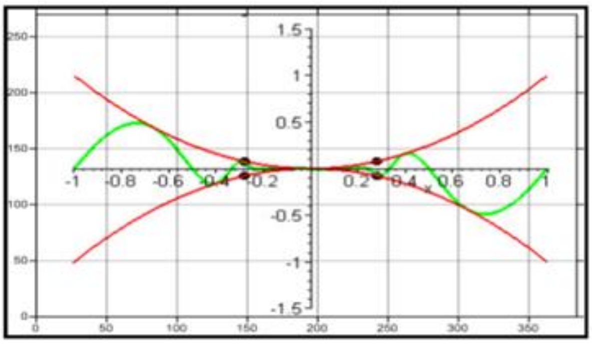

Figure1. *Diagram of strange hold function and structure as pure and algebraic*

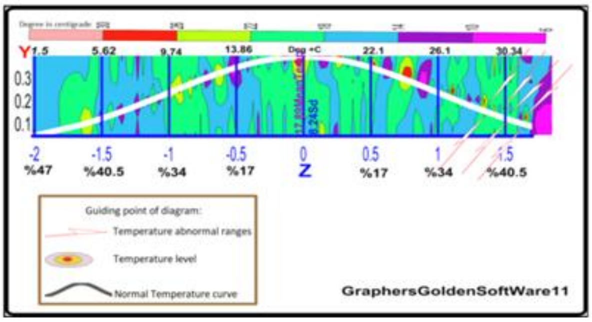

Figure2. *Chaotic structural diagram of the average monthly temperature of Shiraz basin with a period of 30_year*

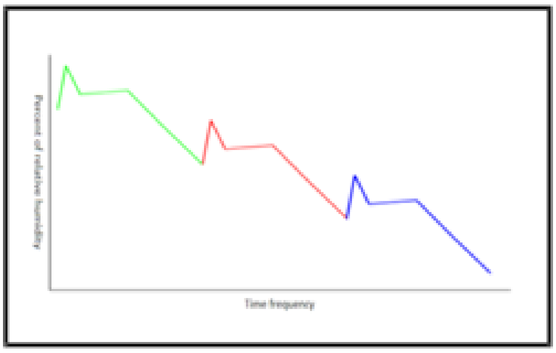

Figure3. *Two dimensional blanket diagram of relative humidity of dynamic fractal in the geomorphic basin of Shiraz*

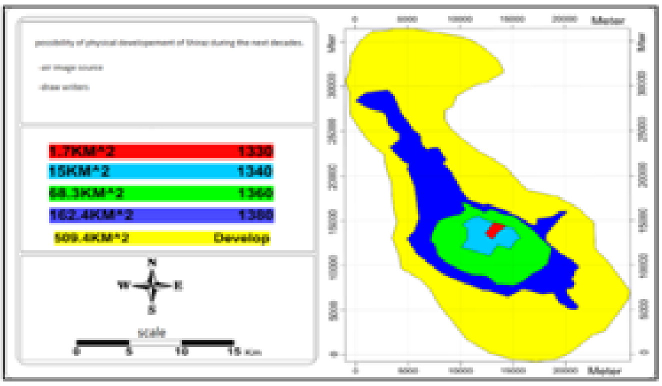

Figure4. *Possibility of physical development of Shiraz*

Area according to km/2	Sequence 1	Sequence 5	Sequence 15	Sequence 20	Sequence 35	Sequence 40
96	21.16743	1.693233	0.879073	0.857635	0.851933	0.851904
97	21.31711	1.695786	0.879133	0.857647	0.8511933	0.851904
98	21.46631	1.698317	0.879193	0.85766	0.8511934	0.851904
99	21.61501	1.700825	0.879253	0.857672	0.8511934	0.851904
100	21.76324	1.703313	0.879311	0.857685	0.8511934	0.851904
101	21.911	1.705779	0.87937	0.857697	0.8511934	0.851904
102	22.05828	1.708224	0.879427	0.857709	0.8511934	0.851904
103	22.20511	1.710649	0.879484	0.857721	0.8511934	0.851904
104	22.35148	1.713053	0.879541	0.857732	0.8511934	0.851904
105	22.4974	1.715438	0.879597	0.857744	0.8511934	0.851904

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