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**OPTIMIZATION OF ENERGY CONSUMPTION WITH GENETIC ALGORITHM IN  
IRAN**

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**ABSTRACT**

Genetic algorithm is a specific type of evolutionary algorithm in which the biological techniques including genetic and mutation are used. Indeed, these principles (Darwinian principles) are used to find optimal formula to forecast the pattern inspired of Darwinian principles of natural evolution. Genetic algorithm is a technique of programming in which the genetic evolution is used as a pattern to solve the problem. The problem which has to be solved is the input in which the solutions encoded and called the "fitness function" based on a pattern, that each solution evaluates the candidates chosen randomly. An evolutionary algorithm is a sub-field of evolutionary technique to find the optimal solution considered for various problems. Along this, the concepts that can be applicable in the present paper are the concepts on the basis of computer science and Genetic science like the algorithm and its various types including search, heuristic, the history of Genetic algorithm and Genetic science, Gene, Chromosome and inheritance. In the present paper, it has been attempted to observe the application of Genetic algorithm in heat flow.

**Keywords-Genetic algorithm; Darwinian principles; Local Heat Flow**

**INTRODUCTION**

Today, in industry optimization project required so as to meet humans' needs especially for being competitive throughout the world. From the early, humans have used empirical approaches to optimize their

projects, yet currently there is no opportunity to use the approaches due to the competitiveness among the international companies, thus the other approaches of optimization including "Genetic algorithm"

were used as alternatives– further a variety of optimization approaches are available for systems and processes. Some of such approaches are mainly used for special usages that cannot be used in heating systems. These exist a variety of approaches including “Genetic algorithm”, “Artificial neural network”, “Fuzzy logic” and “Response surface Methodology” aiming at facilitating optimization of processes and systems. With respect to cost objective function, one can say that maximizing this function is of importance, where this does not go through for total cost objective functions, whereby a definition for the flow field and heat field optimized with genetic algorithm has been represented.

Further, a study by Ortga et al examined the tubular heat exchanger that is optimized through “Genetic algorithm” in a way that decline of pressure in the tube has been shrunk. A study by Mishra et al examined second principle of thermodynamic in plate-fin heat exchanger, that generation of anthropology in this heat Exchanger through the “Genetic algorithm” specified and minimized. The decrease in Anthropology generation in the heat exchanger led to the decrease in pressure through which the decrease in current costs came to realize. A study by Zi et al. studied objective function,

reported that the objective function for the optimization was the weight parameter or the primitive cost minimized through Genetic algorithm at the heat Exchanger. In this study, an attempt to study the use of genetic algorithm in the pipe heat exchanger was made.

A study by Mohammad Hosein Abbas poor (2010) examined efficiency in the systematic heat exchanger in climate conditions across Mashahd city so as to decrease the heat in the greenhouses. For this, the factorial – experimental project for Pipe Heat Exchanger in the surfaces ( 2 and 4 meter), the length of pipes in two surfaces (9 and 18 meter), the genre of pipes in two surfaces (metal and plastic genres), and the velocity of weather flow in two surfaces (7 and 10 m/s) were used as the randomized blocks for three times.

To measure the function of this system, the parameters of the **Comparison** of weather **Output** and **Input**, the exchange of heat energy and the functional-coefficient were all studied. The **Comparison** of weather **Output** and **Input among all variables under study in this paper has been mentioned as the most** fundamental variable. As the metal pipe in the depth (4 meter), length (18 meter) and the weather flow (7 m/s) involves the highest function

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coefficient, it is introduced as the best selection.[2]

### **Main body**

In the early 20<sup>th</sup> century, with respect to the population genetics discipline, Darwin's evolution theory using natural selection was used to prepare Genetic algorithm. The importance of natural selection was accepted as a cause of evolution in other branches of biology. each chromosome as a bit string was mentioned the simplest algorithm. Generally, integers can be used to indicate numeric parameters, though it is possible to use floating point representations. Evolution strategies and evolutionary programming are represented regarding the specificity of the floating point embedded in them. The strategy of real-valued genetic algorithms has been proposed as a misnomer considering the fact that it does not really represent the theory of building block proposed by John Henry Holland in the 1970s. Based on theoretical and experimental results, this theory has received supports. Crossover and mutation at bit-level are conducted in the basic algorithm. Chromosome is considered as a list of numbers inserted into an instruction table, and the nodes in a linked list, hashes, objects, or any other imaginable data structure. As the use of genetic algorithm in the local heat flow is

examined in this study, so representing a description on genetic algorithm is of importance. In this regards, it can say that a genetic algorithm is a search heuristic which follows the process of natural evolution that is used to generate useful solutions in the optimization and search problems. The evolution generally starts from a population of individuals and occurs in sequential generations.

In each generation, the fitness of every individual in the population is taken into account, where the more fit individuals are selected from the current population, each individual's genome is modified to form a new population. Thereby, the new population is used in the next iteration of the algorithm. Generally, the algorithm terminates when a maximum number of generations has been produced.[10]

For instance, assume a particular group of individuals are smarter than other individuals in a community or colony, where In a normal situation, these individuals face a great advancement which high welfare would come to them, and then the welfare leads to long lifetime. If intelligence be hereditary, in next generation in the same community, the number of intellectual individuals would be higher again. If the procedure continues in this way, it can observe that intellectual

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individuals would be again in the community in the sequential generations. Hence, a natural mechanism has led to omission of non-intellectual individuals that the rate of average intelligence in the community constantly keeps increasing. Hence, it can observe that the advancement was possible for each generation within utilization of a simple approach in the nature. Here, it can state that the facts defined previously do not represent all details related to the evolution in the nature. Indeed, optimization and evolution cannot bring about the best samples in the nature. The other point about the Genetic algorithms is that these algorithms Inspired by Darwinian principles of natural evolution are used to find optimal formula to forecast or adjust the patterns. Further, genetic algorithms are used aiming at forecasting techniques on the basis of regression. [3]

### **The procedure to use the Genetic algorithms**

It can state that several solutions for the problem would be resulted using the genetic functions from the genetic algorithms, whereby the primitive population would be manifested in which each response is called chromosome, thereby the chromosomes would be combined with each other so that there would be mutation. Eventually, an

approach for encoding the genomes by means of computer language required applying before implementing a genetic algorithm for a problem.

There is an approach in a genetic algorithm, stated that a population of chosen solutions is evolved to have better solutions for the purpose of optimization. Each solution has a series of properties which can be mutated; traditionally, solutions are represented in binary strings showing with 0s and 1s strings, but other encodings are also possible. There is another similar approach for encoding the solutions, stated that a standard representation of each candidate solution is as an array of bits. Arrays of other types and structures can be used in essentially the same way. In comparison with the other approach—this approach is more difficult. This approach was proposed by Stephan Kremer to guess the three dimensional structures of a protein in the amino acids. Genetic algorithms used in the neural networks are prepared to use this approach. In this regards, another approach is used to display the characteristics of genetic algorithm through a series of characters which each shows a characteristic of the solution. [6]

As shown, given these approaches – It would be easy to change 0 to 1 and vice versa, or, subtract or sum the value of a number, or,

also changing a character to another character, refer to figure 1 for this:

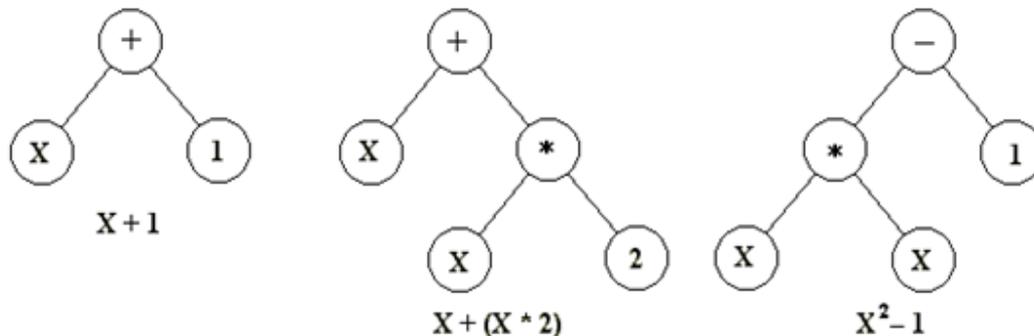


Figure -1: The process for the randomized change

The other approach proposed and then advanced by John Koza is the very genetic programming in which the programs as the branches of data in the tree structure would be shown. This approach shows Tree-like representations exploring in genetic programming; also, graph-form representations are explored in evolutionary programming; a mix of linear chromosomes and tree-like representations is explored in gene expression programming.

Populations of computer programs are used in Gene expression programming. Such computer programs are encoded in simpler linear chromosomes with fixed length, expressed as expression trees. Expression trees or computer programs evolve, and this is due to the fact that chromosomes undergo mutation and recombination in a manner which is similar to the canonical Genetic algorithm. Nevertheless, it has to be appreciated the special organization of Gene

expression programming chromosomes, emphasizing on the point that these genetic modifications always result in valid computer programs. [11]

**Optimization**

The classical approaches in the mathematics involve two fundamental forms. In Most of these approaches, the local optimal point is considered as the total optimal point which each of these approaches involves a particular application for the problem, through which two points are the maximum points in the curve, for this refer to figure 2. One of these two maximum points is the local maximum point.

Now if the mathematic optimization approaches are used, the maximum value of the function has to be found in an interval, e.g. the beginning point starts from point one by which the local maximum value would be achieved, and then the algorithm would be stopped. Yet in the intellectual

approaches particularly in the Genetic algorithm due to the randomized characteristic– if we start from point one – again there would be the possibility to

choose a point, thereby the achievement to the global optimal point would be realized.[8]

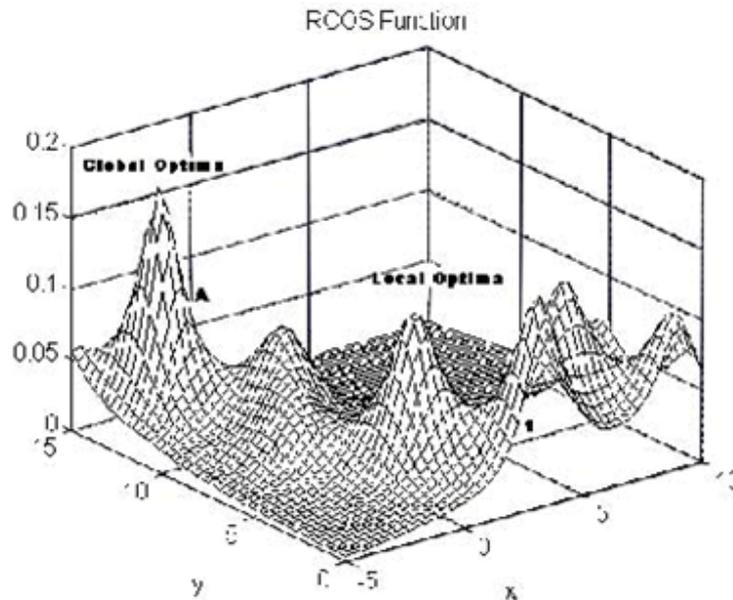


Figure -2: The representation of local and global points

Another important point is that the optimization mathematic approaches mainly lead to a specific instruction or formula for providing solution to resolve the problem. Yet, the intellectual approaches are the principles that can be used in providing solution for any problem. This point would be observed mainly post representing more definitions about the Genetic algorithm.

### Heat optimization for Genetic algorithm

In the present paper, a procedure has been presented to design components of a heat exchanger network with 11.32-0.737-SR type. Firstly, pinch analysis is used to maximize heat recovery for a given

minimum temperature difference. Using a genetic algorithm (GA), each exchanger of the network is designed so as to minimize the total annual cost. Mass flow rate of the utility fluid is also considered as a design variable for exchanger involving hot or cold utilities.

Partial or complete condensation of hot utility fluid can be used here. Purchase and operational cost are considered in the optimization of each exchanger. Combining every exchanger that its cost minimized with the cost of hot utility and cold utility gives the total cost of the heat exchanger network

$z = \frac{\vartheta}{\Delta p_0}$ . The minimum temperature difference yielding the more economical heat exchanger network is chosen as the optimal solution. Two test cases are studied

for which minimized total cost as a function of the minimum temperature difference is shown. A comparison is also made between the optimal solution with the cost of utilities or without it.

Fig. B-1. A direct-transfer intercooler for a 5,000-shp gas turbine plant.

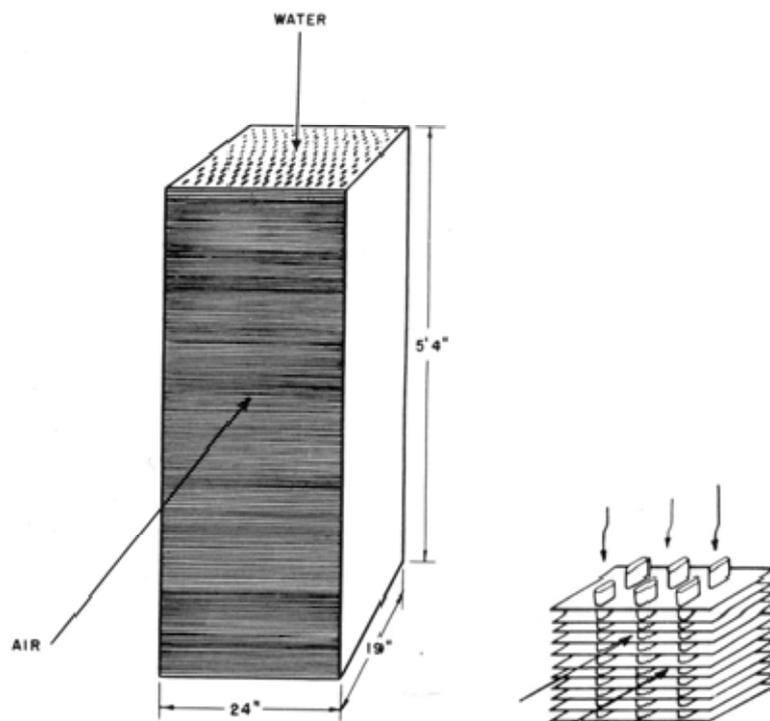


Figure- 3: A direct-transfer intercooler for a 5000-shp gas turbine plant

Other approaches regarding use of real-valued numbers as an alternative for bit strings can be used to show chromosomes. Theoretically, the smaller the alphabet is, the better the performance would be, but paradoxically, good results can be gained from using real-valued chromosomes.

A strategy well-known as elitist selection is a useful variant of general process for constructing a new population through

which some of the better organisms from the current generation are carried over to the next. Parallel implementations of genetic algorithms are represented in two flavors. One kind of the parallel genetic algorithms is assumed as a population on each of the computer nodes and migration of individuals among the nodes. The other kind of parallel genetic algorithms are assumed as an individual on each processor node acting on

neighbor individuals for selection and reproduction. Other variants, like genetic algorithms for online optimization problems are used to introduce time-dependence or noise in the fitness function. “Genetic algorithm” can be easily used for multi-objective problems, mentioned useful for the new environments in which there are various approaches to proliferate the algorithm in order to gain the high quality response in which the approaches could be used. “Genetic algorithm” is an algorithm assuming the artificial intelligence involved of several fundamental sectors is represented as following:

On the basis of Primitive population, indeed the primitive population is a series of solutions for the problem (chromosomes), reported that the genetic algorithm is based on the artificial intelligence; further, it can state that the primitive population is a series of solutions provided for the problem entering to algorithm, and can be chosen in random. The number of primitive population relies on the complexity and the type of problem through which the solutions created and observed in each generation would be determined.

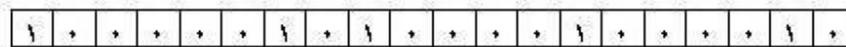


Figure -4: The structure of Chromosome

Considering Chromosome, it can say that chromosomes have been developed from a number of genes which each of the genes creates a sub-path from the real path. Chromosome is a string which makes a path between a start and end point. This path could be pertinent or impertinent, or even impossible, meant that the path of chromosome may be developed from several sub-paths that might not be integrated.

chromosome – if you go through the path 2-8 and then 9-4, however the start and end points are correct, this path could not be an accurate path, and this lies in a fact that the start point of a sub-path has to overlap the start point of the subsequent sub-path through which the integration in the network can be preserved. But surely, in upcoming stages – the sub-paths have been observed and the non-integrated paths have been recognized involving the lower value through which the value in upcoming

For instance, in a network like the following figure in order to reach point 4 from point 2, the first path from the first gene

generations would be omitted, generating

the logic and accurate paths. [4]

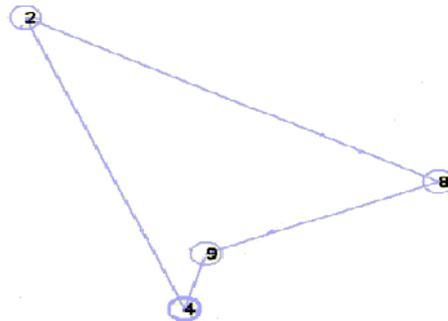


Figure -5: A section of the sample network

The approach for Encoding: The approach for encoding relies on the type of the chromosome genes and based on the fact that each gene has which kind of the data leading to change in the approach. For instance, all the genes of a chromosome could be encoded as 0 and 1 in a binary form, or, the genes of a chromosome could be defined as the integral number with the domain allocated for the values in which a gene can be allocated.

Selection: a proportion of the existing population is selected, that each successive generation breed a new generation. Individual solutions are chosen using a fitness-based process, where fitter solutions regarding a fitness function are more likely to be selected. Certain selection methods are useful for rating the fitness in each solution through which best solutions can be selected. Other methods are used for rating a randomized

sample of the population, as the former process may be such a time-consuming. The fitness function is defined referring to the genetic representation through which the quality of the represented solution is measured. The fitness function is always problem dependent. A demonstration of a solution might be an array of bits, that a different object is represented by each bit reporting the value of the bit as 0 or 1.

The selection through the crossover structure: In this approach, the relative value for each chromosome is considered where on the chromosome is the very assessment function. According to the obtained values based on the figure for the chromosomes, a sector of a circle from relation has been allocated for each chromosome. With the crossover implementation based on the area of the sectors - the chromosomes are chosen and as the parent of the next generation enter to the upcoming stages.

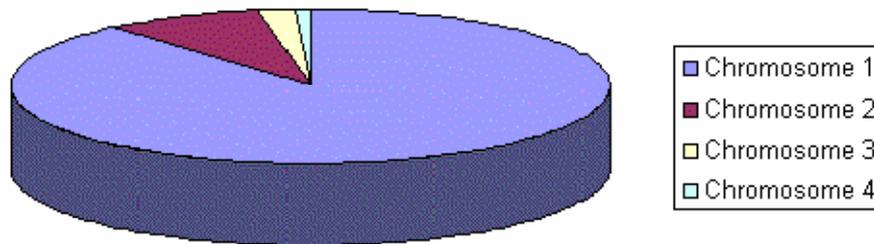


Figure -6: The crossover structure

The selection with the ranking approach: In this approach – the population of the generation is arranged, and then a value allocates for each chromosome based on the “fitness”. The advantage of this approach rather than the previous approach involves the adaptability in such a way that if the comparison of the fitness values in the chromosomes be high –the better function would be resulted, yet due to the point that the comparison of the chromosomes has been decreased, so the convergence gradually occurs.[2]

Selection through the steady state: the approach of the steady state in the Genetic algorithm accomplishes in a way that the based on the following figures proposed as the approaches.

limited number of the chromosomes, or the high fitness is chosen in all the generations, which a number of the chromosomes, or the low fitness chromosomes has to be omitted to make the new Childs, thereby the new Children would be substituted through which the new generation is created and the new children have to be preserved for the new generation.

The replacement: The replacement in the Genetic algorithm plays a very important role to reach the optimal point which one-point replacement,two -point replacement and multipoint replacement, the replacement would be possible

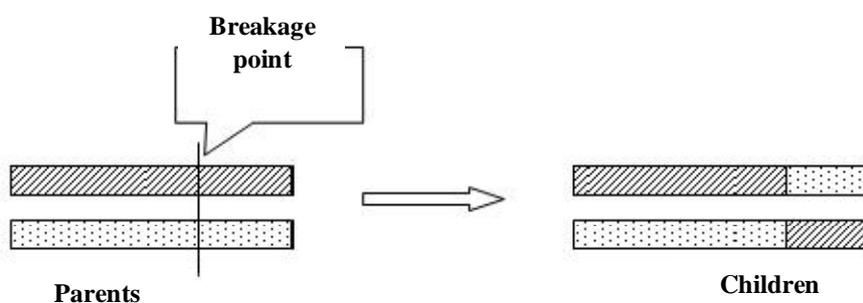


Figure- 7: The one-point replacement

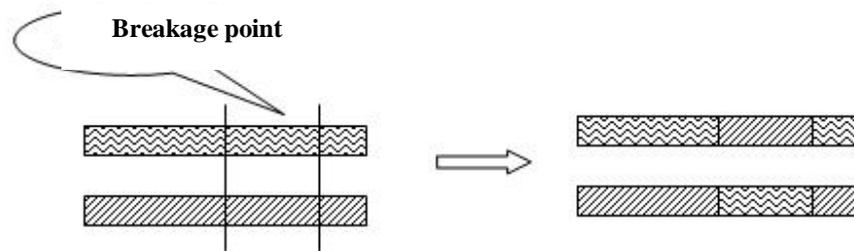


Figure-8: Two-point replacement

A small mutation rate may cause the genetic drift. A recombination rate may cause the premature convergence of the genetic algorithm. A mutation rate that is too high may cause loss of good solutions, unless

there would be an elitist selection. There are theoretical but not yet practical upper and lower bounds for these parameters that can help guide selection.

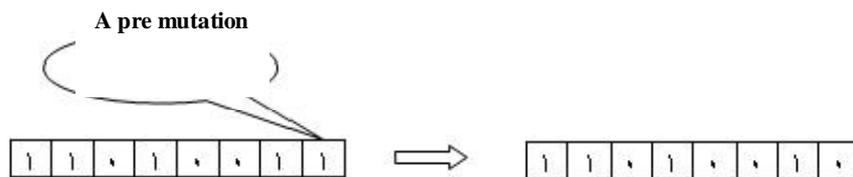


Figure -9: The function of the mutation operator on a chromosome

The cost function: The cost function is the very criterion in which the optimization would be possible showing the best results of the chromosomes, stated that, to gain the best results of the chromosomes – The cost function has been mentioned that it can be a phrase, or a program with an output value through which the best results for the chromosomes would be manifested.

The most fundamental section in order to gain the optimal response by the Genetic algorithm is the very accurate definition of the cost function in which only the step by

step approaches could be helpful, otherwise the optimal response may not be resulted. Further, to gain the optimal results, the increase in the number of repetition is important. The path and time of waiting is a valuable combination from these parameters in which the value turns back to the operator, and due to the fact that time and path are not from a genre, so the normalization is required for the combination for which a similar unit has to be considered for the valuable combination. For this, all the parameters have to be

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divided to a normal value, and then the valuable form of combination would be resulted.[11]

The system of heat exchanger with the weather flow involves a network from the basement pipes that passes the weather flow from the inside of the pipes. A prototype from such a system in Ahmadabad in India compared to desert of Mashhad city has been constructed. All the experiments for the heating and cooling were accomplished during three days. It can state that the temperature of the environment was reported 14 degree cold in may, yet reported 14 degree warm in January. The function coefficient in the cooling and heating was reported as the average 3.3 and 3.8. The function of the heat systems relies on the minimum and maximum temperature in a day. Mashhad desert could be the most pertinent region to use the system in the green houses, due to great changes of temperature in all the day and also in a year. In case of a pertinent function, through the installation of this system in the greenhouse, the heat systems for the green houses can be annihilated,so the reduction of fuel fossil energy and the lifetime of the heat equipments can be increased. In the present paper, the observation on the efficiency of the ground heat exchanger system with the

weather flow in the weather circumstances of Mashhad city has been considered. further, in a research by Haqparast and Borjali (2007), the optimization of the boundary layer stimulation with Genetic algorithm and its application in the cooling systems of Turbine fins – the efficiency for designing and determination of the most pertinent selection based on a particular objective in the boundary layer stimulation through the Genetic algorithm beside the simultaneous solution “computer coding of Teach-t”was observed. The cooling for turbine fins has been mentioned fundamental to use the gas turbine through which the turbine fins would be able to work in a permissible temperature - consequently the increase of lifetime would be resulted. One of the approaches for the boundary layer stimulation is putting the hedges with various dimensions in a certain distance from a plate. Due to The complexity of the flow in surrounding and back of the hedges and for many other reasons resulting in the intensity of stimulation –the creation of a particular approach for designing with pertinent parameters has been prohibited so that the highest stimulation would not be resulted. Genetic algorithm is a very helpful approach in providing solution for the problems, which the objective here is the

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very finding the dimension based on the obligations for the hedges—consequently leading to the increase of transfer coefficient. Further, it has been displayed that the increase of hedge length and the distance of hedge from the plate lead to the reduction of heat transfer coefficient. While, within the increase of height of hedge – the heat transfer coefficient increases as well. The results show that putting a hedge in the cooling fluid path would lead to the increase of heat transfer for six times. [1][3]

### **Methodology**

Genetic algorithm as a computational algorithm for optimization considering a set of points for solution in each computational repetition can search the various regions of the solution. In the search mechanism, however, the value of objective function is not computed – the value computed for the objective function for each point is intervened in the statistical average for objective function in which all the sub-spaces are intervened, and these sub-spaces are in parallel with objective function as statistically measured – this mechanism is called implicit parallelism. This procedure leads to the search for the spaces which the statistical average for objective function is high in this case. Due to the point that the space for the response is searched in this

approach—so that, less possibility for the convergence in a local optimal point is realized. The advantage of this algorithm is that there is no limitation for the optimized function which in the procedure of the search – the value for the objective function in different points is needed. In each repetition— all the strings are encoded through which the value for the objective function is obtained. According to obtained values for the objective function in the range of strings, a “fitness” value allocates to each string through which this “fitness” value—the possibility of selection for each string would be determined. Based on this possibility for selection, a set of strings would be chosen and new strings through the genetic functions would be substituted with the strings from the primitive population—consequently the number of population for the strings in the computational repetition would be fixed.[6] [10]

The randomized mechanism acting on the selection and omission of the strings are in such a way that the strings with higher value of fitness, are more probable to combine and generate new strings that these strings are more stable than other strings in replacement stage. For this, the population of the sequences in a competition based on objective function evolves in various

generations through which the average for the objective function increases. Generally, in this algorithm in the computational repetition- Also the search for the new points from the response space through the genetic operators would be realized. According to the cycle in each computational repetition, new points from the response space are searched through genetic operators—consequently the search procedure for the spaces in which the objective function is more observed would be searched through the selection mechanism. Thereby, three main operators on the strings act that are two genetic operators and the randomized selection function in each computational repetition. Gold Berg introduced the genetic algorithm proposed by John Hold as the simple genetic

algorithm; the genetic algorithm has been generated of natural genetic algorithm. [7]

### **The change of value**

This kind of mutation for binary encoding or other the same encoding within the possibility to change the genes is not realized. In this mutation a little value to the gene involving the mutation circumstance increased or decreased that could be randomly chosen.

The value added or subtracted to the gene relies on the range of gene that could be selected randomly. It is obvious that large values could increase the genetic dispersion. In figure 11, a pattern for this mutation has been shown. This mutation is pertinent particularly for the encoding in which the genes are like the real numbers.

(5.551.29, 5.68, **2.86**, **4.11**) ➡ (1.29, 5.68, **2.73**, **4.22**, 5.55)

Figure- 10: The mutation

As observed in figure 11, second and third genes of chromosome have been mutated. It is obvious from the figure that the selection value for adding or subtracting could be different in various genes.

### **The assessment of implementing the genetic algorithm**

To recognize when the implementation of the algorithm stops – various approaches could be chosen. For instance, the convergence of all the population could be considered, or the distance of the fitness for the best individual among the population from the assessment average could be considered as well, mentioned that the

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distance has to be small from a certain range, or, the value of the objective function has to be higher than a particular range, or even the number of certain generations have to be considered as well. Refer to following stages in this case:

1-To obtain the final response post several repetitions and gain the response in terms of particular error

2- If no improvement with implementation of algorithm observed, in this case the pertinent response has to be obtained

3-To obtain the value for the average of objective function in terms of repetition

4-A fixed number of generations in the algorithm has to be realized

5-The maximum rank for fitness function for the Childs has to be resulted, or, better results have not to be realized

6-Superviison

7-Combinations

### **The limitations for the Genetic Algorithms**

There are several limitations for the use of a genetic algorithm compared to alternative optimization algorithms:

Repeated fitness function evaluation for complex problems are often the most prohibitive and limiting segment of artificial evolutionary algorithms. Finding the optimal solution to complex highdimensional, multimodal problems often requires very

expensive fitness function evaluations. In real world problems such as structural optimization problems, one single function evaluation may require several hours to several days of complete simulation. Typical optimization methods can not deal with such types of problem. In this case, it may be necessary to forgo an exact evaluation and use an approximated fitness that is computationally efficient. It is apparent that amalgamation of approximate models may be one of the most promising approaches to convincingly use genetic algorithm to solve complex real life problems.

Genetic algorithms do not scale well with complexity, and where the number of elements which are exposed to mutation is large there is often an exponential increase in search space size. This makes this phenomenon difficult to use the technique on problems such as designing an engine. The simplest representation methods have to be used to make such problems tractable to evolutionary search. Hence, evolutionary algorithms are seen for encoding designs for fan blades instead of engines, building shapes instead of detailed construction plans, airfoils instead of whole aircraft designs. The second problem of complexity is protecting elements helping for evolving good solutions from further destructive mutation. It has been

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suggested that a developmental approach to evolve solutions could be useful to overcome some issues of protection, but this remains a research question. To improve Genetic algorithm, the following changes are essential:

- 1- Using the local optimal
- 2- Change the parameters such as primitive population , mutation and etc
- 3- Change binary Genetic algorithm

Combining Genetic algorithm with other optimization methods could come useful. Genetic algorithm tends to be quite good at finding generally good global solutions, but quite inefficient at finding the last few mutations to find the absolute optimum. Other techniques are quite efficient at finding absolute optimum in a limited region; Alternating Genetic algorithm can improve the efficiency of Genetic algorithm.

### **CONCLUSION**

In the observations represented in the present paper, it can conclude that algorithms are used for optimization, search, and etc. The basis for this algorithm is inspired of the Darwin's evolution principles, says, weak creatures annihilate whereas the strong ones continue to live. In fact, evolution is a process which accomplishes on the strings, not on the alive creatures introducing the creatures of the string. In fact, based on the

selection principle, it has been stated that the more the adaptability be higher for the conservation of the creatures, the possibility for genetic would be higher. This principle is the basis for the integration between strings and function for the structures encoded. The simplest algorithm represents each chromosome as a bit string. Typically, numeric parameters can be represented by integers, though it is possible to use floating point representations. The floating point representation is natural to evolution strategies and evolutionary programming. When bit-string representations of integers are used, the coding is often employed. In this way, small changes in the integer can be readily affected through mutations or crossovers. This has been found to help prevent premature convergence, in which too many simultaneous mutations, or crossover events, must occur in order to change the chromosome to a better solution. Surely, the search approaches based on the selection mechanism and natural genetic act in the genetic algorithm. The most pertinent strings are chosen among the randomized data through the algorithms mentioned in present paper. In each generation, a new group of strings through the best sections for the previous sequences and the new randomized section to get a

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pertinent response creates, yet these strings are not from the range of the randomized algorithms. Indeed, the strings are provided to discover the data in search space through which a new search with better responses for the best response can be provided. To implement the genetic algorithms, it is required to use the previous data with the new search of selection to gain the advancement. In each repetition, several points from search space are considered in genetic algorithm, so that the convergence for the points to a local maximum decreases. In most search methods, the movement from one point to other point can be realized. These methods involve several errors in search spaces, because the local maximum might be occurred. In this regards, Genetic algorithm for the evolutionary populations from the strings generation, and then each point are assessed-consequently a new population involving the points improved in this procedure realizes with the combination procedure. Despite the search procedure, the simultaneous consideration about the points in Genetic algorithm adapts with the parallel machines, because the evolution for each point is an independent process. Hence, the data about the quality of the solutions through each set of the variables are required for the Genetic algorithm, this is in such a

way that some of the optimization approaches require the data or the recognition from the structure of the problem and parameters. Due to the fact that a particular data from the problem is not essential for genetic algorithm, so this algorithm is more adaptable than many other search approaches. Further, Genetic algorithm is different from the search approaches used the randomized selection procedure for getting recognition of the search approaches, mentioned that however, the chance and randomization are essential to define the decision making methods, the randomization is not recommended in the search space.

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