

International Journal of Statistics and Applied Mathematics

ISSN: 2456-1452
Maths 2016; 1(4): 42-44
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www.mathsjournal.com
Received: 29-09-2016
Accepted: 30-10-2016

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Optimisation use for the real world problem

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Abstract

In this modern era proper utilization of resources is must for getting the success in the competitive environment. Now the question arises how to get the solution of these things, then the clear cut answer is with the help of optimization. Now optimization is can be done manual basis or computer basis. There is lot of complexity in the system, then the manual based solution is far away to get the success rate as desired from the optimization. Hence the only solution to get the desired optimum output is with the help of computer based optimization technique. Basically computer itself is a hardware and to get the solution for the optimization of the real world problem is with the help of algorithms, new procedures developed. Hence the objective of optimization is to provide scientific basis to a person to take the write decision to solve a problem which is the best interest of the organization. Such a solution is known as optimum solution for the intended problem. To get the optimum solution of a problem basically two different aspects are considered, one is administration and other is technical team. The coordination of the both is must for the optimum solution of a given problem.

Keywords: optimization, manual basis, computer basis.

1. Introduction

The basic term “Optimization” is taken from the same way as “optimal”. Its meaning in simple forms is to do the something in best way. There are various problems of the real world where optimization is helpful to do the things in the best way. A few of the examples of the real world for the best way solution is such as manufacturing, production, stock maintenance, engineering as well as transporation, scheduling, business solutions. Mathematical Optimization is a branch of applied mathematics which is useful in many different fields. Now the question is how to optimize the solution of the problem. One of the way is traditional method and other way is modern technique based on the hardware and software of a computer. The traditional method uses the general procedure to propose a number of choices for the controlled parameters. The processes under investigation are then simulated and decision is made on this basis. But on the other technique a computerized technique is used based on algorithms and procedures developed for the intended purpose. The basic optimization problem consist of the objective function, which is the output you’re trying to maximize or minimize. To avoid the guess work for finding and solution and to provide the scientific basis to the decision makers for solving the problem involving the operations of system to give a solution which is in best interest of organization. The solution is called the optimum solution to the problem.

2. Types of Optimization Problems

The various types of optimization problems are such that a few of the problem have constraints and other do not have a constraint. Other category is some optimization problem have one variable and other have many variable. Variables can be discrete such that having only integer values or having the continuous. Other classification is such that a few of the problem have to be optimize are static while some are dynamic. Systems can be deterministic or stochastic. The other classification is that some equation can be linear such as graph or lines or other have nonlinear. In some problems vector describe solution, where as in other cases functions are needed to formulate and solve the problem. The situation is similar to the case of equation or system of equation in which we are interested in vector solution, a bunch of numbers and differential equation. Under such circumstances unknown is a function.

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The transportation and diet problems correspond to linear programming whereas the power circuit estimation are the examples of nonlinear optimization problems. The type of situation where we are interested to find optimal function for specific situation can be classified into variational problems with a brief with dynamic programming.

3. Stages of Optimization

To discuss the topic use of optimization in real world it is must to describe the various stages which are must have to pass in the sequence manner to get the optimum solution. The first phase is to formulate the problem. In other words the problem which is to be optimize is to be defined clearly. The problem should be formulated clearly. To formulate the problem the information required are that first of all objectives have to be defined, it should be decided who will take the decision. Controllable variables and their ranges have to be defined. The next phase is to develop a mathematical model to represent the system which is to be optimize. The most appropriate approach is after formulating the problem it has to be reformulated. After formulating the mathematical model for the problem under consideration, the next phase is to get the solution from this model. The next phase is to test the model and to get the solution. When the model is complete, it should not be taken as a complete one but it should be tested to detect and correct any error. The solution of optimized problem is to get the better performance of the problem. After it the final stage of optimization is to implement and maintain the solution. As the conditions are constantly changed, the solution obtained from the optimization technique is not to be based for the long time. The only solution for this problem is use the optimized model as long as possible and in any case problem arises then detect it immediately and test the model again and make the necessary changes thereof.

4. Broad classification of areas of Optimization

Now a days optimization has got a very large scope. To do the things in a good way, optimization is must in the competitive environment. There are some areas where optimization have a great importance and do the things without optimization is difficult. Optimization can be used in defence. There is shortage of time and decision have to be taken on quick basis and things have to be done in the right direction as well as in the right time. Therefore it is must to formulate the optimum strategies that may provide maximum benefit or help the military executives and managers to choose the best option as well as strategy to win the battle. Hence the use of optimization is of great importance in defence. Other field of optimization is in the Business and industry. There are time to time various challenges and problem in the industry as well as in business. On the manual basis it become very difficult to manage them. The major emphasis in the industry is in the production department. To minimize the cost of production in the competitive age is must. With the optimized technique it can be done easily and faced in the real world. Another areas where optimization can play an important role is that it can be used in agriculture. There are various challenges in front of an agriculture industry such as climate changes, to get the water from the natural resources. The optimization can also be used in planning. Careful planning plays an important role for the economic development of a country.

5. Mathematical approach for optimization

A Mathematical approach is a scientific approach and

justified approach for the optimization. The ultimate success of a particular technique used in optimization greatly depends on it. Every problem statement in mathematical terms should reflect exactly what the user want to solve. While solving optimization based problems two important steps have to be followed in the right way. Firstly the objectives and cost function developed in the model should measure faithfully our idea of optimality. A more desirable solution is have a smaller cost function, be a minimum time. The other factors which have to be consider are the greater efficiency, more benefit, minimum losses etc. In any cost the cost function defined to solve the optimization problem does not match our optimization criteria then the final solution of the problem obtained will not be a optimized one. The second major aspect while considering the mathematical model to optimize a real world problem is that the various conditions generally known as constraints must be clearly defined. These are the two main points forces the optimized problem. The details description of these are as follows- Understanding the criteria for optimality. The objective and the procedure should be clearly defined. Particularly, the decision about the variables and the constraints among these is important. In other words one problem can be set up in many different way then under such circumstances it is must to decide which might be most efficient way of the problem. The interior and exterior boundary value of the variable have to be checked. Another major aspect is to consider and understand the constraint of the problem which is to be optimized. Another way is to emphasis on the precise formulation. It should be checked that if constraint seems coherent. It can be set with the set of feasible vector or set be as empty. Finally the brief analysis of the solution to find out is must. If after optimization it appears that cost is cut off as compare to the previous state or not. Similarly if efficiency is improved or not. If the optimized problem fulfill the entire requirement or not.

6. Scientific method for optimization

How to optimize the real world problem, the scientific approach is equally important and the approach involve the phases-Judgement phase under which the factors are decided for determination of the problem, setting the objectives and values related to the operation of the problem, the determination of suitable measure of effectiveness and formulation of problem relative to objectives. Another aspect is known as Research phase consisting of observation and data collection, observation of experimentation, formulation of hypothesis models, analysis of the available information. Finally generalization of the result. Last phase for scientific method of optimization is known as the Action phase the purpose is making recommendation for decision process by any one in a position to finalize a decision for the problem incurred.

7. Real world Examples of Optimization

The various real world examples of optimization are such as to solve the transportation problem, the diet base problem in which optimization is done to maintain the quality as well to maintain the nutrient at the optimum level. Power circuit state estimation where as it is defined that the state variables of an electric network are the voltages. Similarly designing of a moving solid optimization is used.

8. Conclusion

It has been seen that science and technology are always a step ahead indicating the solution of the problem more easier way

than the earlier phase. On the other hand mathematical model and formula has also been improved. It has been seen that by using technology as well as improved mathematical model solution of the problem can be found in the efficient way. But the real problem is with reference to define the problem clearly and the constraint for the solving the problem. Sometime the problem is not defined clearly as well as no will power to define the problem in details with the thinking that wastage of time and money and tendency to start the solution of the problem in the very initial stage. Although the scientific procedure itself is not the sole way to solve the problem where as general intervention of the human being as well as understanding under the different circumstances is also must.

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