

**SIMPLIFIED APPROACH FOR OPTIMIZATION
BY DYNAMIC PROGRAMMING**

Dr. Alaa Nabil El-Hazek ¹

ABSTRACT

Optimization is the magic key for most engineering projects. It concerns to minimize costs / losses or to maximize returns. In both cases, all existed constraints are to be satisfied. There are many optimization techniques that are widely employed in order to achieve the optimum solutions. In this paper, the dynamic programming, as a powerful optimization technique, is employed for this purpose. The dynamic programming is used by two different methods. The first method is the ordinary technique that called recursive dynamic programming. While the second method is a combination between the dynamic programming and the linear programming, and is called a simplified approach.

Two different models are established. The first model represents a production scheduling for a factory producing pipes. While the second model represents pollution in a river. The optimum solutions are obtained by the PC for the two models applying the two mentioned techniques for each model. These optimum solutions are compared showing high degree of tendency.

It is concluded that the simplified approach is an effective tool to get the optimum solutions for the two models. It is easy, simple, accurate, fast and is solved by a common PC software. It is recommended to provide more study for the simplified approach. Also, it is recommended to investigate its application to problems with maximization objective functions.

INTRODUCTION

It is always required to find the best, or at least near the best, decision among a range of possible decisions or policies. Optimization is usually regarded as a systematic process of finding the best decisions, without having to consider all possible alternatives. Optimization can be considered as an ensemble of steps that must be taken to find the optimum of a function. This function is usually called an objective function and represents a performance index. Common typical objective functions in general are the total costs, to be minimized, or the total benefits, to be maximized. However, optimization is only possible if there is a range of choices available. The success of optimization depends on defining effectively and realistically the problem and developing a reasonable model for the problem system.

Many real world systems can be modeled by linear programming, where there is a linear objective function subject to a set of linear constraints. The objective function is a measure of

¹ Lecturer, Faculty of Engineering at Shobra, Banha University, Cairo, Egypt.

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Optimization, a Simplified Approach William Conley, 1981 *Optimization* TAB Books Staff, 1981-12 Soft Computing Techniques for Machining of Composites V.N. Gaitonde, S.R. Karnik, J. Paulo Davim, 2013-07-31 Special topic volume with invited peer reviewed papers only **Laser Beam Shaping Applications** Fred M. Dickey, Todd E. Lizotte, 2017-02-24 This new edition details the important features of beam shaping and exposes the subtleties of the theory and techniques that are best demonstrated through proven applications New chapters cover illumination light shaping in optical lithography optical micro manipulation of live mammalian cells through trapping sorting and transfection and laser beam shaping through fiber optic beam delivery The book discusses applications in lithography laser printing optical data storage stable isotope separation and spatially dispersive lasers It also provides a history of the field and includes extensive references

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Fundamental Process Control David M. Prett,Carlos E. García,1988 Presents a unifying theoretical framework that includes real practical issues such as process constraints and model errors Modern process control methodologies are compared in light of this framework to allow the development of a new design methodology for controllers Written for control design experts and graduate level students Annotation copyrighted by Book News Inc Portland OR Chemical Engineering Progress ,1989 Encyclopedia of Separation Science Ian D. Wilson,E. R. Adlard,Michael Cooke,C. F. Poole,2000 Volume 1 of this resource encyclopedia contains Level 1 which provides a broad overview of the theory of the 12 main categories of separation techniques Volumes 2 4 Level 2 expand coverage with detailed theoretical and technical descriptions of particular techniques The remaining Volumes 5 9 Level 3 cover applications of these techniques from the micro to the macro and from the analytical laboratory bench to large scale industrial processes The last volume consists mainly of the index

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