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**S Y N O P S I S**

**SYNOPSIS OF DISSERTATION ENTITLED "SOME CONTRIBUTIONS TO DYNAMIC PROGRAMMING"**  
**BEING SUBMITTED BY G.V. SHENOY FOR THE PH.D. DEGREE IN STATISTICS**  
**GUIDING TEACHER : PROFESSOR M.C. CHAKRABARTI, DEPARTMENT OF STATISTICS,**  
**UNIVERSITY OF BOMBAY.**

Dynamic programming is a mathematical technique for solving certain types of sequential decision problems which arise in Operations Research and applied Mathematics. A sequential decision process is characterized as a problem in which a sequence of decisions must be made with each decision affecting the future decisions.

Major part of the material presented in this thesis covers the following research papers :

1. Production - scheduling and employment smoothing problem under uncertain demand. (Published in The Logistic Review, Vol. 6(27), 1970)
2. A solution to the optimal production-scheduling problem. (Presented at the Third Annual Convention of O.R. Society of India, held at Hyderabad, during December, 1970.)
3. On dynamic programming and risk functions. (To appear in the Cahiers du Centre d' Etudes de Recherche Operationnelle, Belgium, Vol. 13, 1971.)

4. An optimization procedure using dynamic programming technique.  
(Accepted for publication in the Journal of the Association Francaise Pour La Cybernetique Economique et Technique, France.)
5. On the warehousing problem. (Presented at the Second Annual Convention of O.R. Society of India, held at Bombay, during December, 1969.)

In the production - scheduling and employment smoothing problem, when the demand (either deterministic or probabilistic) varies from period to period, uniform rate of production throughout the planning horizon is not economical. In such a situation, a planned production level should be maintained taking into consideration all the cost factors and the demand distribution. In the first two papers, a detailed study of this problem has been carried out using dynamic programming technique.

In the third paper, a study of the stochastic decision process in which the parameters themselves are subject to stochastic laws and can be modified as the information is acquired from stage to stage has been made. A dynamic programming approach is used to estimate the loss incurred while estimating the unknown parameters using the Bayes procedure. The knowledge of sufficient statistics is used and the procedure is illustrated with the help of different prior distributions for the unknown parameter.

The fourth paper contains a study of an optimization problem using dynamic programming technique. A stochastic model is developed for the minimization of the over-all loss and explicit solutions are derived for gamma, exponential, normal and beta distributions.

In the fifth paper, a functional equation approach of dynamic programming is given to the warehousing problem. Both single - product and multi-product models are considered here.

In addition to the above, the thesis contains a study of dynamic programming approach to a stochastic investment problem, a multi-stage inventory problem, the assignment problem, the critical path length of PERT and the farm planning. Computer programs written in FORTRAN language, which are run on a IBM 1620 computer system, are included in the thesis so that the numerical problems considered here can be solved more efficiently with the help of a computer. The thesis also contains an introduction which gives the background of programming problems as well as a brief summary of the work done by the previous authors and by the author on the subject.

The present study will advance our existing knowledge of Dynamic Programming Techniques in Operations Research.

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