OPTIMIZATION OF COMPLEX WATER RESOURCES SYSTEM

BY

SCREENING - SIMULATION MODEL

By

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CERTIFICATE

This is to certify that the thesis entitled 'Optimization of Complex Water Resources System by Screening - Simulation Model', which is being submitted by Sri Dinesh Kumar Srivastava to the Indian Institute of Technology, Delhi for the award of the degree of Doctor of Philosophy, is a bonafide research work carried out by him under my guidance and supervision for the last five years and five months. His thesis has reached the standard fulfilling the requirements of the regulations relating to the degree.

The results contained in this thesis have not been submitted in part or full, to any other university or institution for the award of any degree or diploma.

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(Dinesh Kumar Srivastava)

ABSTRACT

The study deals with the first stage preliminary screening design model in the context of a sequential system analysis iterative modelling of a complex water resources system. The models are developed in the context of River Narmada, a large river basin in India. Two types of analytical optimization models are used to find a reasonably small set of possible optimal design alternatives. One is Linear programming deterministic continuous (LPDC) model and another is Linear programming deterministic discontinuous(LPDD) model. Linear programming has been used with appropriate linear approximation of the non-linear functions. A simulation programme has been developed which continues screening on the basis of the information obtained from linear programming model. Is there any close correspondence between the results of linear programming and simulation models, and in what way can they be effectively used together?

It is shown in this study that the results of LPDC screening model are realistic as they compared in terms of reasonableness with values determined by the conventional design methods of project by project analysis, but were definite improvements on them. LPDD model is helpful in selecting the ranges of variables for simulation by random sampling for the alternative selected by LPDC model. Lastly, LPDC model results may be assumed to be nearly optimum and can serve as an input for further screening by simulation.

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