OR APPLICATIONS IN STRATEGIC SECTOR CONSTRUCTIONS WITH CAPITAL BUDGETING

by

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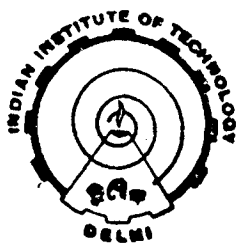
Thesis submitted in fulfilment
of the requirements for the degree of

DOCTOR OF PHILOSOPHY



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CERTIFICATE

The thesis entitled "**O R Applications in Strategic Sector Constructions with Capital Budgeting**" submitted by Mr. Kuldip Chander to the Indian Institute of Technology, Delhi, for the award of the degree of Doctor of Philosophy, is a record of bonafide research work carried out by him. He has worked under my guidance and supervision and has fulfilled the requirements for the submission of this thesis, which has attained the standard required for a Ph.D. degree of this Institute. The results presented in this thesis have not been submitted elsewhere for the award of any degree or diploma.

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ABSTRACT

Specific characterstics distinguishing constructions in strategic sectors include: block allocations over a number of consecutive time-periods; releases of resources (and funds) in upper and lower bounds; finances earmarked suffering diminutions in their realisable worth due to transfers over time and space.

A certain category of problems refers to allocation of resources (and funds) to several projects at different sites with co-extensive headquarter control. The problem is to secure necessary funds for each project subject to the said diminution by transfers within the projects. Solution by LP formulation does not ensure allocations in consecutive years. Zero-One formulation can obtain allocations during consecutive periods allowing also for diminution of funds due to transfers but becomes too unwieldy for solution. A transportation algorithm has been developed alongwith a heuristic second stage of the algorithm to realise needful period-wise allocations for all projects at minimum cost in the needful transfers of funds.

A second category of problems deals with situations where available funds are generally inadequate unlike as above. Zero-One formulation could not provide for inter-project priority so as to eliminate non-subscribable project units. An LP formulation is usable though the solution process becomes almost enumerative.

Another category of problems involves sharing of multi-resources at multi-projects where the allocations beyond a floor level to each project are conditioned by the headquarter on specific goal realisations. A goal programming model proceeds with sequential decision-making with iteratively redefining the preferred levels of achievements in the several project components.

A last category of strategic sector construction pertains to allocation of resources to individual units within a single project site without obligation to headquarter. The iterative goal settings and obtaining of satisficing solutions with higher magnitudes of achievements of project components are realisable faster than in the last-said category of problems.

The applicability of the problem formulations and the solution methodologies have been demonstrated through case facts.

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CONSTRUCTION IN STRATEGIC SECTORS

CHAPTER II

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CHOICE OF PROJECT FACILITIES UNDER DECENTRALISED GOAL SETTINGS (WITH UPPER AND LOWER BOUNDS ON FUNDS) (CATEGORY IV)