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MAHMUT PARLAR, "INTERACTIVE OOPERATIONS RESEARCH WITH MAPLE. METHODS AND MODELS", BIRKHÄUSER, BOSTON, 2000, ISBN 0-8176-4165-3

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The book is structured in 10 chapters, followed by a list of references and an index, all covering 468 pages. The first two chapters introduce the main topics referring to Operations Research (OR) and Maple, while the third, Maple and Mathematical Foundations of Operations Research, presents the main functionality of Maple in performing mathematical operations, with focus on those needed in OR field: algebra, calculus, linear algebra, differential equations, transform methods, and probability theory.

The next seven chapters are dedicated to a particular OR topic: linear programming, nonlinear programming, dynamic programming, stochastic processes, inventory models, queueing systems, and simulation. Every chapter follows the same pattern: an introduction, followed by the presentation of OR methods, techniques, and example problems, accompanied by solutions using Maple. A summary and a list of proposed exercises are given at the end of each chapter.

The linear programming chapter presents the general form of linear programming problem, the graphical and simplex solutions, exemplified for production and transportation problem, and two-person zero-sum games. Special cases, difficulties, sensitivity analysis, and duality are also covered.

The nonlinear programming chapter introduces the general nonlinear programming problem, convexity sets and functions with examples, unconstrained and inequality/equality constrained optimization, and Lagrangian duality.

The dynamic programming chapter starts with the presentation of the general concepts of dynamic programming problem, followed by discussion of some particular cases like models with a linear system and quadratic cost and continuous-time dynamic programming. Examples include the stagecoach problem, the infinite-stage problem, the constrained work force planning problem, the gambling model with myopic optimal policy, and optimal stopping problems.

Exponential distribution and Poisson processes, renewal theory, discrete-time Markov chains, and continuous-time Markov chains are the main topics discussed in the stochastic processes chapter. Accompanying examples include time-dependent

arrival rate in a restaurant, random walk, periodic-review inventory systems, machine maintenance problem, birth and death processes, a self-service car wash and vacuum facility with extra capacity, and response areas for emergency units.

The inventory models chapter introduces and classifies those models and the associated costs followed by a detailed presentation of deterministic and probabilistic models. Deterministic inventory models and related topics discussed are: the basic EOQ (economic order quantity) model, the EOQ model with backorders, the analysis of implied backorder costs, and quantity discounts. In the class of probabilistic inventory models are considered the continuous-review model (in approximate and exact formulations), the one-period model with random demand, and dynamic inventory models.

Markovian queueing systems, their transient solutions, queueing networks, and optimization of queueing systems are the main topics of the queueing systems chapter. Concrete problems and models discussed include birth and death processes, M/M/1, M/M/1/K, M/M/c, $M^X/M/1$, and $M/M/\infty$ queueing systems, serial queue with blocking, Jackson networks, transportation queueing processes, and optimal dynamic service rate control.

The last chapter is dedicated to simulation. It deals with methods for generating (pseudo-) random numbers (mixed-congruential, Maple's uniform random number generator, Kolmogorov-Smirnov test for uniformity), generating random variates from other distributions (exponential random variates, Maple's random variates generator), Monte Carlo simulation (used to evaluate definite integrals numerically and to simulate a static single-period problem), dynamic simulation models (inventory system with random yield, non-Markovian queues), and optimization of random search.

The book can be considered as an essential reference material for students, professors, researchers, and practitioners who learn, teach, and use OR principles, methods, and techniques in various areas, from management science, engineering, and mathematics departments in universities to R&D, marketing, production, and other departments in companies. Examples presented throughout the book illustrate the capabilities and usefulness of Maple computer algebra system in formulating and solving various real-world OR problems.

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