Optimization: Algorithms and Applications

Rajesh Kumar Arora
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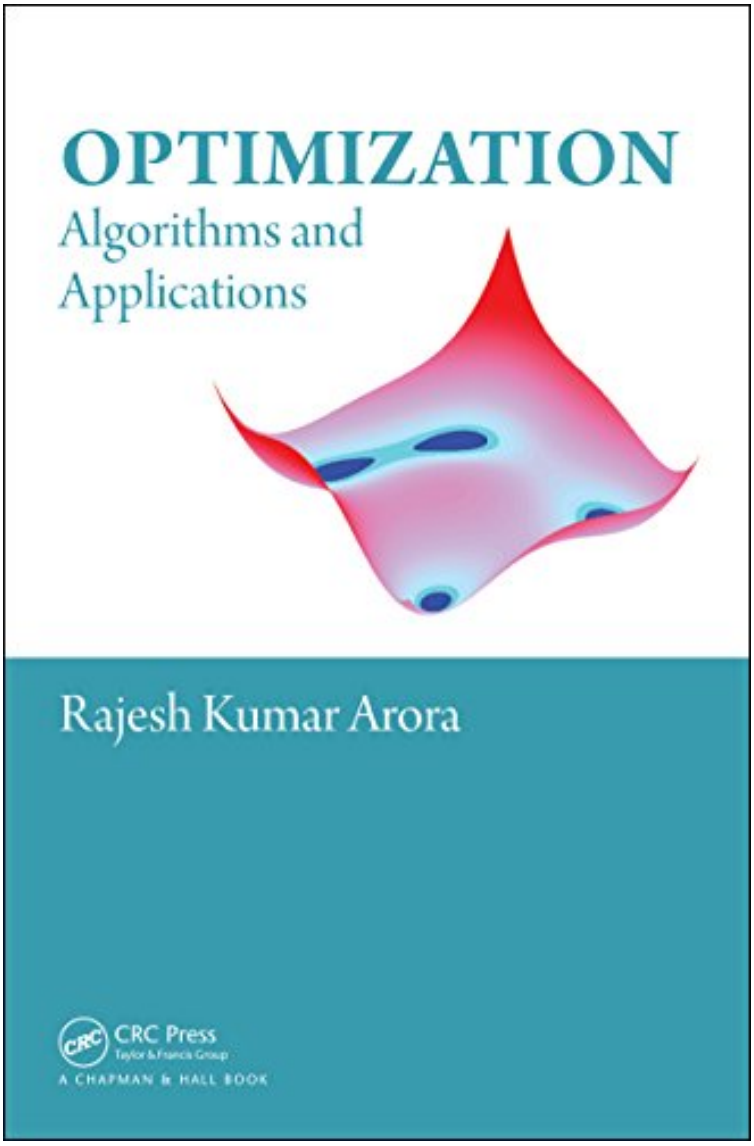

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Choose the Correct Solution Method for Your Optimization ProblemOptimization: Algorithms and Applications presents a variety of solution techniques for optimization problems, emphasizing concepts rather than rigorous mathematical details and proofs. The book covers both gradient and stochastic methods as solution techniques for unconstrained and constrained optimization problems. It discusses the conjugate gradient method, Broydenndash;Fletcherndash;Goldfarbndash;Shanno algorithm, Powell method, penalty function, augmented Lagrange multiplier method, sequential quadratic programming, method of feasible directions, genetic algorithms, particle swarm optimization (PSO), simulated annealing, ant colony optimization, and tabu search methods. The author shows how to solve non-convex multi-objective optimization problems using simple modifications of the basic PSO code. The book also introduces multidisciplinary design optimization (MDO) architecturesmdash;one of the first optimization books to do somdash;and develops software codes for the simplex method and affine-scaling interior point method for solving linear programming problems. In addition, it examines Gomoryrsquo;s cutting plane method, the branch-and-bound method, and Balasrsquo; algorithm for integer programming problems.The author follows a step-by-step approach to developing the MATLABreg; codes from the algorithms. He then applies the codes to solve both standard functions taken from the literature and real-world applications, including a complex trajectory design problem of a robot, a portfolio optimization problem, and a multi-objective shape optimization problem of a reentry body. This hands-on approach improves your understanding and confidence in handling different solution methods. The MATLAB codes are available on the bookrsquo;s CRC Press web page.