Preface

Electricity demand varies during each day and each week due to the cycling pattern of our life. In addition, electricity is an instantaneously perishable commodity and still cannot be efficiently stored in bulk. These facts raise an interesting question for electrical power generation: how to meet the time varying demands in the most economical way. To answer this question, a great amount of research efforts have been devoted to the Unit Commitment (UC) problem, which aims to optimally schedule the "on" and "off" statuses and power dispatches of electrical power generating units while considering multiple technical and economic constraints. The UC problems are mostly formulated as mixed integer linear programs. Based on different perspectives and purposes, there are many variants for the UC problem. These problems draw a lot of attentions from both power industry practitioners and academic researchers. Many types of algorithms have been developed for or applied to UC problems, such as dynamic programming, Lagrangian relaxation, general mixed integer programming algorithms, Benders decomposition, etc. This book focuses on two-stage stochastic unit commitment models and advanced techniques to efficiently solve the large-scale problems due to scenario propagation.

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