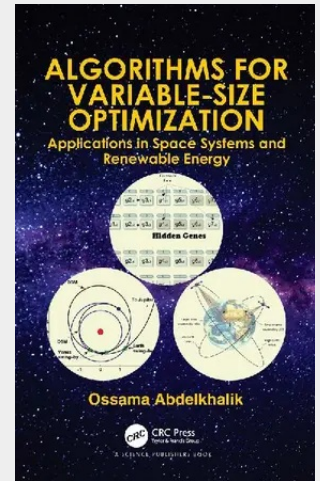


Algorithms for Variable-Size Optimization

Applications in Space Systems and Renewable Energy

Many systems architecture optimization problems are characterized by a variable number of optimization variables. Many classical optimization algorithms are not suitable for such problems. The book presents recently developed optimization concepts that are designed to solve such problems. These new concepts are implemented using genetic algorithms and differential evolution. The examples and applications presented show the effectiveness of the use of these new algorithms in optimizing systems architectures. The book focuses on systems architecture optimization. It covers new algorithms and its applications, besides reviewing fundamental mathematical concepts and classical optimization methods. It also provides detailed modeling of sample engineering problems. The book is suitable for graduate engineering students and engineers. The second part of the book includes numerical examples on classical optimization algorithms, which are useful for undergraduate engineering students. While focusing on the algorithms and their implementation, the applications in this book cover the space trajectory optimization problem, the optimization of earth orbiting satellites orbits, and the optimization of the wave energy converter dynamic system: architecture and control. These applications are illustrated in the starting of the book, and are used as case studies in later chapters for the optimization methods presented in the book.

This book focuses on systems architecture optimization. The first two parts are a concise presentation for classical optimization methods. Part three presents recent advances in systems architecture optimization. Part four outlines detailed engineering applications.



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