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Nota di contenuto   Foreword by William Fitzgibbon -- Foreword by Roland Glowinski -- Preface -- 1 Introduction -- 2 Evolutionary Methods -- 3. Multi-Objective EAs And Game Theory -- 4. Advanced Techniques for Evolutionary Algorithms (EAs) -- 5. Multidisciplinary Design Optimisation and Robust Design in Aerospace Systems -- 6. A Framework for Numerical Design and Optimization Algorithms -- 7. Single Objective Model Test Case Problems -- 8. Multi-Objective Optimization Model Test Case Problems -- 9. Robust Multi-Objective and Multi-Disciplinary Model Optimization Test Cases -- 10. Robust Airfoil Design Optimization with Morphing Techniques -- Appendix: Two "Hand-On" Examples of Optimization Problems.

Sommario/riassunto

Many complex aeronautical design problems can be formulated with efficient multi-objective evolutionary optimization methods and game strategies. This book describes the role of advanced innovative evolution tools in the solution, or the set of solutions of single or multi disciplinary optimization. These tools use the concept of multi-population, asynchronous parallelization and hierarchical topology which allows different models including precise, intermediate and approximate models with each node belonging to the different hierarchical layer handled by a different Evolutionary Algorithm. The efficiency of evolutionary algorithms for both single and multi-objective optimization problems are significantly improved by the coupling of EAs with games and in particular by a new dynamic methodology named "Hybridized Nash-Pareto games". Multi objective Optimization techniques and robust design problems taking into account uncertainties are introduced and explained in detail. Several applications dealing with civil aircraft and UAV, UCAV systems are implemented numerically and discussed. Applications of increasing optimization complexity are presented as well as two hands-on test cases problems. These examples focus on aeronautical applications and will be useful to the practitioner in the laboratory or in industrial design environments. The evolutionary methods coupled with games presented in this volume can be applied to other areas including surface and marine transport, structures, biomedical engineering, renewable energy and environmental problems . The book will be of interest to students, young scientists and engineers involved in the fields of aerospace, aeronautics, UAV, aerial robotics design and multi physics optimization.