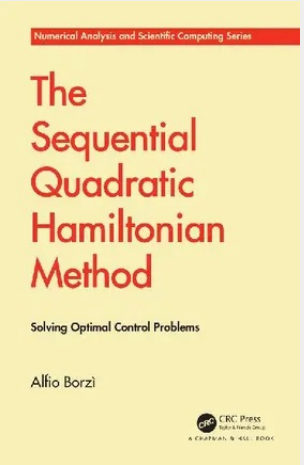
Borzì

The Sequential Quadratic Hamiltonian Method

Solving Optimal Control Problems



The sequential quadratic hamiltonian (SQH) method is a novel numerical optimization procedure for solving optimal control problems governed by differential models. It is based on the characterisation of optimal controls in the framework of the Pontryagin maximum principle (PMP). The SQH method is a powerful computational methodology that is capable of development in many directions. The Sequential Quadratic Hamiltonian Method: Solving Optimal Control Problems discusses its analysis and use in solving nonsmooth ODE control problems, relaxed ODE control problems, stochastic control problems, mixed-integer control problems, PDE control problems, inverse PDE problems, differential Nash game problems, and problems related to residual neural networks. This book may serve as a textbook for undergraduate and graduate students, and as an introduction for researchers in sciences and engineering who intend to further develop the SQH method or wish to use it as a numerical tool for solving challenging optimal control problems and for investigating the Pontryagin maximum principle on new optimisation problems. Features - Provides insight into mathematical and computational issues concerning optimal control problems, while discussing many differential models of interest in different disciplines. - Suitable for undergraduate and graduate students and as an introduction for researchers in sciences and engineering. - Accompanied by codes which allow the reader to apply the SQH method to solve many different optimal control and optimisation problems.

The SQH method is a powerful computational methodology that is capable of development in many directions. This book discusses its analysis and use in solving nonsmooth ODE control problems, relaxed ODE control problems, stochastic control problems, mixed-integer control problems, PDE control problems, and more.

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