



## On the Numerical Solution of Nonlinear and Hybrid Optimal Control Problems

By Matthias Rungger

Kassel University Press Sep 2012, 2012. Taschenbuch. Condition: Neu. This item is printed on demand - Print on Demand Neuware - In this doctoral thesis an algorithm for the solution of a nonlinear and hybrid optimal control problem is developed and analyzed. The algorithm is based on the Dynamic Programming Principle, where the infinite problem is approximated by a finite problem. The finite approximation is obtained by a partitioning of the state space, together with a time and input space discretization. The resulting finite optimal problem is equivalent to a shortest path problem. Therefore, it is solvable by known graph theoretic methods. The outcome of this procedure is a function which is derived from the solution of the shortest path problem that associates to every partition element a control input. The control function is then applied to the control system in a sample-and-hold scheme, i.e., at each sample time the control input which is associated to the partition element that contains the current state, is applied to the system and kept constant over the sampling interval. It is shown that the performance of the resulting closed-loop system converges to the optimal performance as the discretization parameters decrease to zero. Additionally,...



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