

A probabilistic algorithm for optimal control problem

Abstract

In this paper we present a direct method for the numerical solution of the constrained optimal control problem when the gradient information is not available. At this aim, a new control parameterization based on Bernstein basis functions is suggested to convert control problem into nonlinear programming problem (NLP), and then a recently proposed stochastic algorithm called Probabilistic Global Search Johor (PGSJ) is considered for the solution of resultant NLP. The underlining idea of the PGSJ algorithm is to use probability density functions (PDF) to direct the search while no recombination operator is used. This algorithm along with the new Bernstein-based control parameterization (BCP) is compiled into BCP/PGSJ direct method to be applied to approximate the solution of the control problem up to the accuracy required. This method is lastly implemented while simulating some case studies which illustrate the efficiency of the method.