

A Posteriori Error Bounds for Two Point Boundary Value Problem with Uncertain Parameters

Andrew Pownuk, Jazmin Quezada

The University of Texas at El Paso

Estimating errors of the solution of differential equations is a very important task in many areas of science and engineering. In this presentation approximation errors and uncertainty will be taken into account simultaneously. In this work the authors assumed that only upper and lower bounds of parameters are given. The goal is to find upper and lower bound of the solution with high accuracy. The problem can be solved by using variational formulation and the Finite Element Method. Extreme values of the solution can be found by using special optimization methods. In order to increase the accuracy of the solution a posteriori error estimation was applied. The grid points can be found by using special adaptive algorithm. Presented methodology can be applied to large scale problems and solved by using parallel computing. The method was applied for the solution of sample two point boundary problem with the uncertain parameters.