# A FINITE ELEMENT METHOD AND ITS CONVERGENCE FOR AN ELLIPTIC INTERFACE PROBLEM

Victor F. Payne, M. O. Adewole and S. Adetona Ajibola

## Abstract

In this paper, we employ regularity assumptions on the true solution of an elliptic interface problem as well as domain approximation technique made popular by B. Deka [Finite element method with numerical quadrature for elliptic problems with smooth interfaces, J. Comput. Appl. Math. 234(2) (2010), 605-612] and Chen and Zou ([Finite element methods and their convergence for elliptic and parabolic interface problems, Numer. Math. 79(2) (1998), 175-202] and references therein) respectively in the finite element method for elliptic problems with smooth interfaces. It is shown that the discrete solution converges to the exact solution optimally in the order of estimates on $L^2$-norm and $H^1$-norm where the regularity of the solution may be different throughout the whole domain. An example is furnished to illustrate the principle.