

Accuracy of the Different Element Types for the BEM Solutions of the 2-D Boundary Value Problems

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Abstract

In the Boundary Element Method (BEM) formulation of the 2-dimensional (2-D) boundary value problems, the boundary of the problem domain is separated in to elements. In this study, the well known element types constant, linear and quadratic elements, and also originally defined corresponding curved ones (curved constant, curved linear and curved quadratic) elements are used and compared in the solution of the Laplace equation on the both circular and elliptic domains. The comparison is done in terms of the L_2 norms, absolute errors and relative errors. In contrast to expectation, the linear elements give more accurate results compared to the quadratic ones. Therefore, we conclude that higher order elements always do not give higher accuracy in the numerical solutions due to the numerical errors.

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