

New Estimation technique of the optimal source points location in the method of fundamental solutions for multi-connected problem

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Abstract

In this presentation, a new estimation technique will be proposed to estimate the numerical error of the method of fundamental solutions (MFS) for solving the multi-connected problem. The successful experiences of simply-connected problem are extended to deal with multiply-connected problems. The sources are distributed on the inner and outer fictitious boundaries, respectively, in multiply-connected domain. The optimal sources location and the optimal number of sources are found without comparison with a given analytical solution of an interested problem. The convergent numerical solutions of the MFS adopting the optimal parameter can be obtained in unavailable analytical solution condition. Finally, several numerical experiments of multi-connected problem are given to demonstrate the validity and accuracy of the error estimation technique.

Keywords: error estimation, optimal parameter, method of fundamental solutions, Trefftz set, discretizing error, simply-connected problem, multi-connected problem, error magnitude, numerical error, convergence rate.