Single Integral Equation Method for Solving Multi-medium Problems

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Abstract

In this paper, based on the general stress-strain relationship, displacement and stress boundary-domain integral equations are established using the Source Point Isolation Method for single medium, which are capable of solving quite wide range of engineering problems with varying material properties. And from the established integral equations, a set of single interface integral equations are derived for solving multi-medium problems by making use of the variation feature of the material properties. The displacement and stress interface integral equations derived in this paper can be applied to solve non-linear, non-homogeneous, and anisotropic mechanical problems in a unified way.

By imposing some assumptions on the derived interface integral equations, detailed expressions for these integral equations are obtained for different particular cases, and a few numerical examples are given to demonstrate the correctness of the derived displacement and stress interface integral equations.

Keywords: Multi-Medium, BEM, Interface integral equation, Interface degeneration method, Source point isolation method