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Identification of the boundary conditions for plates on elastic foundation by boundary element method

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Abstract

In this paper, a boundary element method is developed for the free vibration problem of plates resting on an elastic foundation. Based on the direct boundary element method, a complete set of boundary integral equations and relevant numerical scheme are established. The identification procedure is performed by combining the boundary element method with the optimization techniques. Two examples, respectively associated with plate structures and the pavement-subgrade system, are presented to illustrate both the boundary element method and the identification procedure proposed in this paper.

Key words: *Micro-alloyed steel, Austenitization, Materials modelling, Hot stamping, Phase transformation*

1. Introduction

In this paper, we focus our attention on the developing an identification method to determine the boundary conditions of plates resting on an elastic foundation. This research is an important category in the pavement-subgrade system. In this case the Rayleigh-Ritz method is unsuitable because the constructing trial function is quite difficult for various complicated boundary conditions. A finite element formulation for such problem is also disadvantageous since a lot of repeated computation will be necessarily required when the boundary conditions are changed in the iterations proceed. However the boundary element method is very convenient for such problem (Tanaka *et al.*, 1988; Tanaka *et al.*, 1988; Murai and Kagawa, 1986).

So in this paper, a boundary element method is developed for the free vibration problem of plates resting on an elastic foundation. The fundamental solution of the problem is derived by Hankel transform. Based on the direct boundary element method, a complete set of boundary integral equations and relevant numerical scheme are established. The inverse problem of identification procedure is performed by combining the boundary element method with the optimization

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