

A New Boundary Element Method for Analysis of Laminated Sandwich Plates: An Analog Equation Solution

Abstract

A new boundary element method is developed for the analysis of laminated sandwich plates modelled by Mindlin's theory which permits the satisfaction of three physical conditions along the plate boundary. The presented method is achieved using the concept of the analog equation method (AEM). According to this concept, the original governing differential equations are replaced by three uncoupled Poisson's equations with fictitious sources under the same boundary conditions. The fictitious sources are established using a technique based on BEM and approximated by radial basis functions series. The solution of the actual problem is obtained from the known integral representation of the potential problem. Thus, the kernels of the boundary integral equations are conveniently established and evaluated. The presented method has all the advantages of the pure BEM since the discretization and integration are performed only on the boundary, and consequently laminated sandwich plates with general boundary conditions can be analyzed without difficulty. To illustrate the effectiveness, applicability as well as accuracy of the method, numerical results of various example problems are presented.

Keywords: boundary element method, meshless, analog equation method, sandwich plates, Mindlin's theory, radial basis functions