Transmission conditions for biharmonic equations with discontinuous coefficients and numerical solution of boundary value problem

Zahir MURADOGLU

Department of Mathematics, Kocaeli University, Kocaeli, Turkey
E-mail: zahir@kocaeli.edu.tr

Abstract: The mathematical model of bending problem for the plate system which is composed of inhomogeneous elastic plates with differing elastic properties is presented by boundary value problems for the biharmonic differential equations of with discontinuous coefficients. Providing continuity at the common borders of the plates, determination of transmission conditions among them and the development of methods for finding suitable numerical aproximate solution for the problem keep up to date for applied mathematics.

The fundamental aim of this study is to obtain the transmission condition of plates system composed of elastic plates with differing elastic properties, their difference equations and then the numerical solution at different boundary conditions. Firstly, we can represent the potantial energy of plates system. Later, finite difference approximations of transmission condition at common boundary of plates is obtained by functional approximation method with the help of numerical approximation of derivative and integral.

In this paper, we obtain numerical solution of biharmonic equation with discontinuous coefficient at different boundary conditions and the analysis of numerical results is given.

Keywords: biharmonic equation,transmission condition

2010 Mathematics Subject Classification: 65N06, 74G15, 35J40

References

[1] Samarski, A.A., Andreev, V.B.,"Difference methods for elliptic equations", *Nauka*, Moscow, 1976.