

On the estimation of the eigenfunctions of biharmonic operator in closed domain

Anvarjon Ahmedov^a, Siti Nor Aini Mohd Aslam^{2b} and Gafurjan Ibragimov^c

^a Faculty of Industrial Science & Technology, Universiti Malaysia Pahang, Gambang, Kuantan, 26300, Pahang, Malaysia

^b Institute for Mathematical Research (INSPEM), Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

^c Faculty of Science, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

ABSTRACT

In the current research, the sufficient conditions for uniform convergence of the eigenfunction expansions of the biharmonic operator in closed domain are investigated. The problems which appear in the study of various vibrating systems are the reasons to develop the theory of eigenfunction expansions of the biharmonic operators. Because of the mathematical description of the physical processes taking place in real space are based on the spectral theory of differential operators, particularly biharmonic operator. The biharmonic equation is encountered in plane problems of elasticity. It is also used to describe slow flows of viscous incompressible fluids. In this paper the uniform estimations for eigenfunctions of biharmonic operator is obtained using the resolvent operator of the biharmonic equations. In the future works the obtained estimation will be used to prove uniform convergence of eigenfunction expansions of biharmonic operator in closed domain.

KEYWORDS:

Biharmonic operator; Convergence; Eigenfunction expansions; Mean value