

Free Vibration and Buckling of Rectangular Plates under Nonuniform In-Plane Edge Shear Loads

Authors : T. H. Young, Y. J. Tsai

Abstract : A method for determining the stress distribution of a rectangular plate subjected to two pairs of arbitrarily distributed in-plane edge shear loads is proposed, and the free vibration and buckling of such a rectangular plate are investigated in this work. The method utilizes two stress functions to synthesize the stress-resultant field of the plate with each of the stress functions satisfying the biharmonic compatibility equation. The sum of stress-resultant fields due to these two stress functions satisfies the boundary conditions at the edges of the plate, from which these two stress functions are determined. Then, the free vibration and buckling of the rectangular plate are investigated by the Galerkin method. Numerical results obtained by this work are compared with those appeared in the literature, and good agreements are observed.

Keywords : stress analysis, free vibration, plate buckling, nonuniform in-plane edge shear

Conference Title : ICAMME 2019 : International Conference on Applied Mechanics and Mechanical Engineering

Conference Location : Vancouver, Canada

Conference Dates : August 07-08, 2019