عنوان مقاله:

Vibration and buckling analysis of moderately thick plates using natural element method

محل انتشار:

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خلاصه مقاله:

Using natural element method (NEM), the buckling and the free vibration behaviors of moderate thick plates is studied here. The basis of NEM is natural neighbors and Voronoi cells concepts. The shape functions of nodes located in the domain is equal to the proportion of common natural neighbors area divided by area that related by each Voronoi cells. First step in analyzing the moderate thick plates is identification boundaries. This is done by nodes scattering on problem domain. Mindlin/Reissner theory is used to express the equations of moderate thick plate. First and second order shape functions obtained from natural element method are used to discretize differential equations. Using numerical integration on whole discrete equations of domain, stiffness, geometry and mass matrices of plate are obtained. Buckling loads and vibration modes are expressed by substituting these matrices in plate equations of motions. Arbitrary shapes of plate are selected for solution. Comparing the results of the current approach with those obtained by other numerical analytical methods, it is shown that natural element method can solve problems with complex areas accurately

کلمات کلیدی:

natural vibration, buckling, natural elements, Voronoy cells