ABSTRACT

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The objective of this study was to calculate buckling load of a thin circular plate with an eccentric hole. The circular plate was subjected to the uniformly distributed load at outer edge. Three different types of boundary's conditions had been investigated. Firstly, both inner and outer edges were clamped. Secondly, only the outer edge was clamped with free support at inner edge. Thirdly, both inner and outer edges were simply supported. Comparison results from energy method of Rayleigh-Ritz on Bipolar Coordinate (v,u) with finite element method by ABAQUS program. The effect of hole radius and eccentricity were studied. Ratio of hole radius to plate radius was varied from 0.05 to 0.5. Eccentricity ratio, distance from center of hole to center of plate to radius of plate, was varied from 0 to 0.5. The deflection equation used in energy method of Rayleigh-Ritz was in the form $w = f(v)\sum_{i=0}^{m}\sum_{j=0}^{n} B_{ij} v^i \cos(j \cdot u)$, where B_{ij} were 13 constants and $f(v)$ was the deflection function made w satisfied each kinematics boundary condition. It was found that the buckling load calculated from both methods increased for larger hole while eccentricity constant. At the same radius ratio, while increasing eccentricity ratio, the buckling load decreased. Both methods agree with each other when eccentricity ratio and radius ratio less than 0.3.

Buckling parameter was presented as the solutions and could use for calculate buckling load in every size of the studied radius and eccentricity ratio.