

A new locking-free polygonal plate element for thin and thick plates based on Reissner-Mindlin plate theory and assumed shear strain fields

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A new n -noded polygonal plate element is proposed for the analysis of plate structures comprising of thin and thick members. The formulation is based on the discrete Kirchhoff Mindlin theory. On each side of the polygonal element, discrete shear constraints are considered to relate the kinematical and the independent shear strains. The proposed element: (a) has proper rank; (b) passes patch test for both thin and thick plates; (c) is free from shear locking and (d) yields optimal convergence rates in L_2 -norm and H_1 -semi-norm. The accuracy and the convergence properties are demonstrated with a few benchmark examples.