Closed form solutions for element matrices of 4-node rectangular plate element using IFM

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ABSTRACT: This paper presents closed form solutions for equilibrium and flexibility matrices of the Mindlin-Reissner theory based 4-node rectangular plate bending element using Integrated Force Method (IFM). Use of closed form solutions of equilibrium and flexibility matrices reduce the computational time significantly and more suitable for the plate bending problems with square/rectangular boundaries. Large number of standard square/rectangular plate bending benchmark problems have been analyzed for central deflections and moments using the presented closed form solutions. Results are compared with those of similar displacement based plate bending elements available in the literature. The results are also compared with the exact solutions.