

Large deflection analysis for thin-plate bending problem using HRK approximation

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Summary

In this presentation, large deflection analysis for thin-plate bending problem using Hermite Reproducing Kernel (HRK) approximation is presented. HRK approximation for thin-plate bending problem is one of meshfree/particle approaches and is proposed by Wang [1]. The deflection and rotations are represented by the Hermite-type approximation. In the formulation, the rotations are represented by the differentiation of deflection and the approximation is satisfied Kirchhoff Mode Reproducing Condition (KMRC). Sub-domain stabilized nodal conforming integration is adopted to enforce integration constraint in the numerical integration. Total Lagrangian method is adopted to solve thin-plate bending problem with geometrical non-linearity. Green-Lagrange strain and second Piola Kirchhoff stress are used. Newton-Raphson method is adopted in the nonlinear analysis procedures. The mathematical formulation and the discretization for thin-plate bending problem are demonstrated. Some numerical examples are shown and the results are compared with the results of commercial software MSC/Marc. The convergence and the accuracy of the solutions are discussed.

1. Wang D., Chen J. S., A Hermite reproducing kernel approximation for thin-plate analysis with sub-domain stabilized conforming integration, *International Journal for Numerical Methods in Engineering*, 74, pp. 368-390, 2008.

