APCOM & ISCM
11-14th December, 2013, Singapore

Nonlinear Analysis of Stiffened Plate Structures using Meshfree Approach

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In this presentation, a modeling of thin-walled structures and the nonlinear analysis using a meshfree approximation is presented. The thin-walled structures *e.g.*, stiffened plate structures are composed by a combination of plates. The calculation needs a geometrical and material nonlinear formulation. Reproducing kernel is applied to approximate the in-plane and out-of-plane deformation of the plates. Plane stress condition is assumed in the deformation; a stress component of thickness direction is ignored. Stabilized conforming nodal integration (SCNI) is adopted to integrate the tangent stiffness matrix to impose so-called integration constraint (IC). The IC eliminated zero energy modes of the solution which are occurred in performing direct nodal integration of the stiffness matrix. Multiple-point constraint (MPC) technique is adopted to define the geometric boundary condition and to connect the plates. Numerical examples for the stiffened plate structure are demonstrated in this presentation.

Keywords: Galerkin-based meshfree approach, RKPM, Mindlin-Reissner plate, nonlinear analysis