Analysis of a Plane-Stress Problems using Matrix Free Galerkin Explicit Finite Volume Method for Unstructured Triangular Mesh

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ABSTRACT

In this article, a new finite volume solver which uses a matrix free Galerkin approach for explicit solution of weak form of two dimensional Cauchy equilibrium equations is introduced. This method is suitable for linear structural problems for which two-dimensional assumption can be applied. In this work, the two dimensional equations of motion governing the plane stress problems are solved on unstructured triangular meshes. In order to present the accuracy of computed results of introduced method, a plate test case under distributed load with available computed results from other numerical methods are utilized. The results presented in terms of stress and strain contours and compared with the available analytical solution.

KEYWORDS

Numerical Modeling, Galerkin Finite Volume Method, Plane Stress Analysis, Unstructured Triangular Mesh

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¹ FEM ² CSM ³ FVM

⁴ FDM ⁵ CFD

⁶ GFVM

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