Galerkin Meshless Formulations for 3D Beam Problems

Author(s): Victoria E. Roşca • Elena Axinte • Elena-Carmen Teleman
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Abstract text:
The main idea of meshless methods is to approximate the unknown field by a linear combination of shape functions built without having recourse to a mesh of the domain. The computational domain is discretized using a set of scattered nodes. The shape functions associated with a given node is then built considering the weight functions whose support overlaps the one of the weight function of this node; thus, there is actually no need to establish connectivities between the different nodes as in the finite element method. Monte-Carlo integration techniques are promising schemes in the context of meshless techniques. The purpose of the present paper is to implement in EFG a new body integration technique for the evaluation of the stiffness matrix that does not rely on a partition of the domain into cells, but rather points. Numerical examples based on three-dimensional elasticity problems are presented to examine the accuracy and convergence of the proposed method. In this context, Quasi-Monte Carlo integration techniques are used. The results are compared to traditional EFG. Conclusions are drawn concerning the proposed techniques and its capabilities.
Key Words:
Meshless Formulations; EFG; 3D Elasticity; Monte-Carlo Integration Techniques.

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Author(s) Information

Victoria E. Roşca
Affiliation: „Gheorghe Asachi" Technical University, Jassy, Department of Civil and Industrial Engineering.
Email: roscave@yahoo.com
Elena Axinte
Affiliation: „Gheorghe Asachi" Technical University, Jassy, Department of Civil and Industrial Engineering.
Email: -
Elena-Carmen Teleman
Affiliation: „Gheorghe Asachi" Technical University, Jassy, Department of Civil and Industrial Engineering.
Email: teleman@ce.tuiasi.ro

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