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(51) International classification	:G06F0030230000, G06F0017130000, G06F0111100000, G06F0030200000, G06F0030280000	(71) Name of Applicant : 1) Prof. (Dr.) Anil Kumar Address of Applicant :Professor, Department of Applied Sciences and Humanities, IMS Engineering College, Ghaziabad, Uttar Pradesh, India- 201015 -- ----- 2) Prof (Dr.) Vinai K. Singh 3) Dr. Vandana Yadav 4) Dr. Sudhir Singh 5) Dr. Vaibhav Kumar 6) Dr. Pradeep K Joshi 7) Dr. Amita Joshi 8) Dr. Rajan Singh Name of Applicant : NA Address of Applicant : NA
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(57) Abstract :

The present invention relates to a computer-implemented system and method for solving partial differential equations (PDEs) using the Finite Element Method (FEM) based on Galerkin's technique. The invention automates the symbolic derivation of weak formulations from user-defined PDEs, generates finite element meshes, assembles global matrix systems, and computes numerical solutions using efficient solvers. It supports adaptive mesh refinement based on error estimation to enhance solution accuracy while optimizing computational resources. The system handles various types of PDEs, boundary conditions, and element geometries, providing a flexible and extensible framework for accurate and efficient simulation of complex physical phenomena in engineering and scientific applications. Accompanied Drawing [FIGS. 1-2]

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