

ERROR ESTIMATION OF BILINEAR GALERKIN FINITE ELEMENT METHOD FOR 2D THERMAL PROBLEMS

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**Abstract**  
This study demonstrates a two-dimensional steady state heat conduction Laplace partial differential equation solution using the bilinear Galerkin finite element method. Heat transfer analysis is of vital importance in many engineering applications and devising computationally inexpensive numerical methods while maintaining accuracy is one of the primary concerns. The method uses structured mesh grid over a two-dimensional rectangular domain and solved using a stiffness matrix for the bilinear elements, calculated using the proposed modified numerical scheme. Several numerical experiments are conducted by controlling the number of nodes and changing element sizes of the presented scheme, and comparison made between analytical solution and software generated solution.

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