

## Finite Element Approximation of the Heat Equation under Axisymmetry Assumption

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**Abstract :** This work deals with the finite element approximation of axisymmetric problems. The weak formulation of the heat equation under the axisymmetry assumption is established for continuous finite elements. The weak formulation is implemented in a C++ solver with implicit march-in-time. The code is verified by space and time convergence tests using a manufactured solution. The solving of an example problem with an axisymmetric formulation is compared to that with a full-3D formulation. Both formulations lead to the same result, but the code based on the axisymmetric formulation is much faster due to the lower number of degrees of freedom. This confirms the correctness of our approach and the interest in using an axisymmetric formulation when it is possible.

**Keywords :** axisymmetric problem, continuous finite elements, heat equation, weak formulation

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