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**Meshless element free Galerkin method for unsteady nonlinear heat transfer problems.**

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Summary: In this paper, meshless element free Galerkin (EFG) method has been extended to obtain the numerical solution of nonlinear, unsteady heat transfer problems with temperature dependent material properties. The thermal conductivity, specific heat and density of the material are assumed to vary linearly with the temperature. Quasi-linearization scheme has been used to obtain the nonlinear solution whereas backward difference method is used for the time integration. The essential boundary conditions have been enforced by Lagrange multiplier technique. The meshless formulation has been presented for a nonlinear 3-D heat transfer problem. In 1-D, the results obtained by EFG method are compared with those obtained by finite element and analytical methods whereas in 2-D and 3-D, the results are compared with those obtained by finite element method.

**MSC:**

[80A20](#) Heat and mass transfer, heat flow (MSC2010)

[80M30](#) Variational methods applied to problems in thermodynamics and heat transfer

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**Keywords:**

[meshless EFG method](#); [backward difference method](#); [temperature dependent material properties](#); [finite element method](#); [nonlinear heat transfer](#)

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