

OFEM: An optimum finite element algorithm for heat transfer problem in twodimensional insulated-tip rectangular fin

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ABSTRACT

Among various available numerical solution techniques, finite element method (FEM) is one of the important methods of those. Usually elements are sub-divided uniformly in FEM which is known as conventional FEM (CFEM) to obtain temperature distribution behavior in a fin or plate for various aerospace and mechanical engineering applications. Hence, extra computational complexity is needed to obtain a fair solution with required accuracy. In this paper, an algorithm is proposed to generate non-uniform sub-elements and then implemented on FEM to obtain optimum FEM (OFEM) solution to reduce the computational complexity. This OFEM is applied for the solution of two-dimensional heat transfer problem in an insulated-tip thin rectangular fin. The obtained results are compared with CFEM. It is found that the OFEM exhibit around 65% more accurate results than CFEM showing its potentiality.

KEYWORDS:

Conventional finite element method; Optimum finite element method; Heat transfer problem

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