

Numerical Methods and Approximations for the Heat Transfer Problem

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Abstract

In many studies of the heat transfer problems, many scientifics have studied the heat transfer problems by solving partial differential equations without any use of approximations or finding the solutions with experimental data. In this paper, we analyze the heat transfer problem using a heat source in a closed environment and how it transfers in the neighboring sections. We refer to mathematical concept to make possible the simplification of the complexity that associates such thermodynamic problems. We will discuss such a problem as a discrete one, easily computable, rather than treating it as a continuous one. We have reduced this problem into solving a simple system of linear equations and differential equations. In many cases differentialequations are hard and difficult to solve. So, we use numerical methods to approximate the differential equations to algebraic equations and solve them. We will compare differentialalgorithms used and show which one of them performs better under our test conditions. The program will simulate the heat transfer of a single heat source in a closed environment. The results of the simulations will be presented in graphs and demonstrated in visual settings. In theend, we will provide our conclusions on the performance of the numerical methods. We achieve the purpose of this study, which is to analyze the heat generation analysis and heat transport inthree-dimensional space as to the neighboring sides of a closed enviroment.

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