

几类 n 阶线性常系数常微分方程的解法及应用

摘 要

常微分方程中, 讨论了 n 阶线性微分方程的解法, 而关于应用较少. 本文就几类 n 阶线性常系数常微分方程的解法及应用展开研究.

首先, 依据微分方程一般理论分析了齐次线性微分方程和非齐次线性微分方程两类方程的解法. 对于齐次线性微分方程, 介绍了利用特征值法求基本解组, 进而求通解. 对于非齐次线性微分方程, 着重介绍常数变易法、比较系数法与拉普拉斯变换法.

最后, 简单介绍了在机械运动中的应用. 通过本文的讨论, 能够清楚如何利用微分方程解实际问题.

关键词: n 阶线性常系数常微分方程; 齐次; 非齐次; 应用

Solutions and Applications of Several Classes of Ordinary Differential Equations with n-order Linear Constant Coefficients

Abstract

In ordinary differential equations, the solution of n order linear differential equations is discussed, but few applications are concerned. In this paper, the methods and applications of several kinds of order linear ordinary differential equation with constant coefficients are studied.

Firstly, based on the general theory of differential equation, the solutions of homogeneous linear differential equation and non-homogeneous linear differential equation are analyzed. For homogeneous linear differential equation, the eigenvalue method is introduced to find the basic solution group, and then the general solution. For non-homogeneous linear differential equation, the constant variation method, the comparison coefficient method and Laplace transform method are emphatically introduced.

Finally, a brief introduction is given to the application in mechanical motion. Through this discussion, we can clearly understand how to solve practical problems with differential equations.

Key Word: N-order linear constant coefficient ordinary differential equation; homogeneous; inhomogeneous; application

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