

Applications of Maple and Matlab in Mathematics, Physics and Engineering

Abstract

Maple and Matlab are high-performance languages for technical computing. It integrates computation and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. This allows the researcher to solve many technical computing problems, especially in Mathematics, Physics and Engineering. In this presentation we discuss some applications of Maple and Matlab in different fields. In the beginning of this presentation, we will discuss about the performance of scanning method to find any stability diagrams. The stability region of Block methods for ODE and DDE by scanning method will be shown and the stability regions of applicable deterministic and stochastic systems in physics will be considered. Besides that, scanning method is also used to find the acceptable stability region with testing convergence or divergence of the system in any point. Next we focus on the heat transfer equations, we will discuss the similarity functions and transferring PDE to ODE. Some limitations of Maple packages which cannot solve all types of heat transfer equations, especially to obtain the stability region or second solution of problems by controlling guessing values will be deliberated. The unknown sensitive parameters for these problems and obtain the acceptable region for the parameters will be discussed. Then, application of Maple and Matlab for solving optimization and optimal control problems and image processing to find edge detection of images and image recognition will be presented. The last part is to discuss about the prediction and forecasting by using the Neural Network in Matlab toolbox and Matlab codes by using some Statistic methods such as Autoregressive Method (AM) and Nonlinear Autoregressive Method (NAM).