Approximate solution for the Cauchy type singular integral equation using ODE approaches

Abstract

The unknown function in the Cauchy type singular integral equation is expanded using Taylor expansion at the singular point t = x. Each term in the equation is then integrated yielding a linear ordinary differential equation. It is shown that the obtained linear ODE is uniformly convergent to the Cauchy type singular integral equation. The linear nth order ODE is reduced to a system of first order ODE which is solved numerically using Euler method. Numerical examples are presented to show the accuracy and efficiency of the method.

Keyword: Cauchy integral equation; Taylor expansion; Linear ODE