Numerical Methods
Course Assignment Report

by

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Abstract

In this work we present the analysis of the linear advection equation modelled in one dimension, x, without sources or sinks of the advected variable ϕ. The exact expression of the equation is:

$$\phi_t + u\phi_x = 0 \tag{1}$$

We consider the case of constant and uniform wind, u, and with given initial condition $\phi(x,0) = \phi_0$. It can be shown that the analytic solution of (1) is:

$$\phi(x,t) = \phi_0(x - ut) \tag{2}$$

We have modelled equation (1) using several numerical schemes, currently:

- FTBS
- FTCS
- CTCS

This report contains the preliminary results, the full analysis will be presented in the final version of the submission.

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