

# Numerical Methods

## Course Assignment Report

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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  $\phi$ . 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 current preliminary results.

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