

# Numerical solution of ordinary differential equations

**Chapman & Hall - The Numerical Solution of Ordinary and Partial Differential Equations**

Problem-2: Ordinary Differential Equation (ODE)

Use Euler's explicit numerical method to write a Matlab code to solve the linear first-order ODE given by

$$\frac{dy}{dt} = t - y, \quad y(0) = 1.$$

The exact analytical solution to the above ODE is given by

$$y = t - 1 + 2e^{-t}$$

This exact solution must be used to compare with the numerical solution obtained by Matlab code.

To solve this ODE, you need to create two m-files. The first is a general purpose function file named `Euler_forward.m` that solves any first-order ODE using Euler's explicit method. The second is a function file named `simple_linear_ODE.m` that evaluates  $f(y,t)$ , i.e., the right-hand side of the ODE specified in the problem statement. The name of the second function file is supplied to the first function.

The function `Teval` can be used to pass the values of  $t$  and  $y$  to `simple_linear_ODE.m` and calculate  $f(y,t)$  at the point(s),  $t$ .

Description: -

- Great Britain -- History -- James I, 1603-1625
- Differential equations -- Numerical solutions.Numerical solution of ordinary differential equations
- Numerical solution of ordinary differential equations
- Notes: Includes bibliographical references (p. 452-460) and index.
- This edition was published in 1994



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## Numerical solution of differential equations pdf

First, based on a novel word-of-mouth propagation model, we model the original problem as an optimal control problem. Two study cases are considered.

## Differential equation

Boundary-Value Problems and Methods 6.

## Numerical solution of ordinary differential equations GTU CVNM PPT

We'll need the new slope at this point, so we'll know where to head next.

## Numerical solution of ordinary differential equations GTU CVNM PPT

In this equation we have a way to determine the solution at position  $x$  and time  $t + Dt$  given that we know the solution at three positions,  $x$ ,  $x + Dx$ , and  $x + 2Dx$  at time  $t$ . The aim is to show the efficiency of the presented method and its advantage over other method.

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