

Introduction

1. Background on Euler.
 - a. Born April 15th, 1707 and died September 7th, 1783.
 - b. Student of Johann Bernoulli.
 - c. Provided works to number theory, differential equations, calculus of variations, and many other areas of mathematics and science.
2. Differential Equations
 - a. Other methods such as Laplace Transforms and homogeneous equations are learned first and used to find the exact value of the equation.

Main

1. How to do Euler's Method
 - a. Definitions needed for use of the method?
 - i. h : the step size used for the estimation of the equation (the smaller the number the better).
 - ii. x_0, y_0 : boundary constraints that are given.
 - iii. $y(x)=z$: the estimation that you are trying to find where x will be equal to some integer (use step size h until you get to what x is equal to)(if you are given $y(8)=z$, then use the step size, h , to approximate what z would equal ($h=2$ could be a possible step size)).
 - iv. *True Value*: actual value of the differential equation.
 - v. *True Error*: $E_t = \text{True value} - \text{Approximate value}$. Error of the approximation.
 - vi. *Relative True Error*: $= \text{True Error} / \text{True Value}$. Percent error.
 - b. Formula: $y_{i+1} = y_i + f(x_i, y_i)h$
2. Application of Euler's Method
 - a. When to use it in Differential Equations?
 - i. For the estimation of differential equations.
 - b. Other possible methods?
 - i. Laplace Transforms.
 - ii. Homogeneous Methods.
 - iii. Non-homogeneous Methods.
3. Example

Closure

1. Significance of Euler's Method to Differential Equations.
 - a. Easy estimations of D.E's, can be time consuming and tedious though when compared to other methods of estimation.
 - b. Can also be used in the estimation of integrals.
2. Questions?
3. References
 - a. <http://www-history.mcs.st-and.ac.uk/Biographies/Euler.html>
 - b. <http://www.youtube.com/watch?v=4CqaepeaJHA>
 - c. http://nm.mathforcollege.com/videos/youtube/01aae/measuringerrors/measuringerrors_01aae_trueerror.html
 - d. http://www.youtube.com/watch?v=33fS7V75C_Y