Backward Divided Difference

Major: All Engineering Majors

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Transforming Numerical Methods Education for STEM Undergraduates

Backward Divided Difference

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Definition

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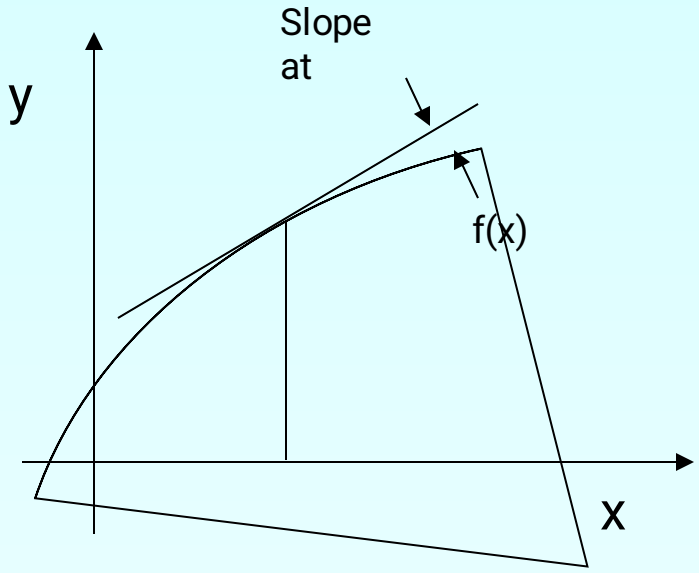
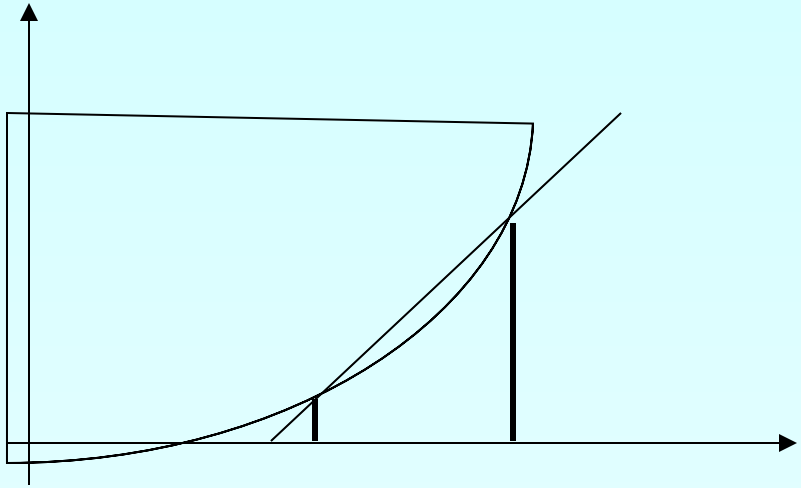


Backward Divided Difference



Example

Example:

The velocity of a rocket is given by

where given in m/s and is given in seconds. Use backward difference approximation

Of the first derivative of to calculate the acceleration at Use a step size of

Solution:

Example (contd.)

Example (contd.)

Hence

The exact value of can be calculated by differentiating

as

Example (contd.)

The absolute relative true error is

Effect Of Step Size

Value of Using backward Divided difference method.

Effect of Step Size in Backward Divided Difference Method

Initial step size=0.05

Effect of Step Size on Approximate Error

Initial step size=0.05

Effect of Step Size on Absolute Relative Approximate Error

Initial step size=0.05

Effect of Step Size on Least Number of Significant Digits Correct

Initial step size=0.05

Effect of Step Size on True Error

Initial step size=0.05

Effect of Step Size on Absolute Relative True Error

Initial step size=0.05

Additional Resources

For all resources on this topic such as digital audiovisual lectures, primers, textbook chapters, multiple- choice tests, worksheets in MATLAB, MATHEMATICA, MathCad and MAPLE, blogs, related physical problems, please visit

http://numericalmethods.eng.usf.edu/topics/continuous_02dif.html

THE END

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