GIRTON SUMMER PROGRAMME

MATHEMATICS FOR ENGINEERING

NUMERICAL TECHNIQUES: HOMEWORK QUESTIONS

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The Homework Answers sheet can be downloaded from Moodle. Once completed (for all five homeworks) is must be uploaded as a ".pdf".

Question: Numerical-1

By using the Newton Raphson technique, obtain an iterative relationship to determine the (positive) cube root of a quantity b > 0.

Enter your iterative relationship on the **Homework Answers sheet.**

Question: Numerical-2

By using the expressions below for the exact (x and y) and computer representations (x* and y*) estimate the fractional error when two floating point numbers are multiplied.

$$x^* = x\,(1 + \varepsilon_x) \quad \text{and} \quad y^* = y\,(1 + \varepsilon_y) \quad \text{where} \quad |\varepsilon_x| \text{ and } |\varepsilon_y| < \varepsilon_{precision}$$

Enter your fractional rounding error estimate in the box on the **Homework Answers sheet.**

Question: Numerical-3

Using Gauss-Lobatto quadrature estimate $\int_{-1}^{+1}\left(\frac{1}{6+x-x^2}\right)dx$ using n = 3 points

Enter your estimate in the box on the **Homework Answers sheet.**