ENGR122 Assignment 6

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DUE: 1pm 14 September 2018

1. Use the Newton-Raphson method to find the value of the roots of the following equations correct to two decimal places (i.e. with tolerance 10^{-2}). An approximate root, x_1, is given:

$$e^{x/2} - 5x = 0, \quad x_1 = 6$$

2. Determine the position of all maximum points, minimum points and points of inflexion of

   (a) $y = 2t^3 - 21t^2 + 60t + 9$

   (b) $y = t(t^2 - 1)$

   (c) $y = e^x + e^{-x}$

3. A function, $y(x)$, satisfies the equation

$$y'' + y^2 = x^3, \qquad y(0) = 1, y'(0) = -1$$

   (a) Estimate $y(0.25)$ using a third-order Taylor polynomial.

   (b) Estimate $y(0.25)$ using a fourth-order Taylor polynomial.

4. (a) Given $y(x) = \cos(kx)$, k a constant, obtain the third-, fourth-, and fifth-order Taylor polynomials generated by $y(x)$ about $x = 0$.

   (b) Write down the third-, fourth-, and fifth-order Taylor polynomials generated by $y = \cos(2x)$ about $x = 0$.

The marks are 20,30,20,30 for questions 1-4. Total is 100.