

MAT 2384 A Assignment # 5
due Friday, November 7th

Solve the following initial value problems:

1. $y'' + y = \sec x, \quad y(0) = y'(0) = 1$
2. $x^2 y'' - 2xy' + 2y = x^2, \quad x > 0, \quad y(1) = 2, \quad y'(1) = 4$

Solve the following nonhomogeneous systems:

3. $y_1' = 4y_1 - 2y_2 - 2x - 5, \quad y_1(0) = 2$
 $y_2' = 3y_1 - y_2 - 2x - 3, \quad y_2(0) = 2$
4. $y_1' = 2y_1 - 4y_2 + 10x - 2x^2, \quad y_1(0) = 2$
 $y_2' = 4y_1 - 6y_2 + 2 + 12x - 4x^2, \quad y_2(0) = 1$
5. Use Simpson's Rule with $2n = 8$ steps to approximate $\int_0^2 \frac{2x}{1+x^2} dx$ to 6 decimal places. Compare your result with the true value by calculating the simple error (ie $|true - approx|$).
6. Repeat Question #5 with Gaussian Quadrature with 4 steps.