Computer Science

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Numerical analysis for computer science mayors

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Assignment Problems

1. Solve the following ODE,  using.

a. Approximate y (0.4) second order Runge-Kutta with h=0.2 and y(0)=0.

A piece of paper with math equations

Description automatically generated

b. Using the previous results use Adam-Bashforth(predictor) two step explicit method in conjunction with Adam-Moulton two step implicit method (corrector) to approximate y (0.8) with h=0.01

A close-up of a math problem

Description automatically generated

c. Use MATLAB to approximate and plot the solution from x=0 to x=1 using 2nd order Runge-Kutta with h=0.2 and y (0) =1

A screenshot of a computer

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2. Given the following ODE, 𝑦′ + 5𝑦 = sin(𝑥)

a. Approximate by hand y (0.03) using 4th order Runge-Kutta with h=0.01 and y(0)=0.

A math equations on a piece of paper

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b. Using the previous results use Adam-Bashforth three step explicit method to approximate y (0.05) with h=0.01

A paper with writing on it

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c. Use MATLAB to approximate and plot the solution from x=0 to x=1 using 4th order Runge-Kutta with h=0.01 and y (0) =1.

A screenshot of a computer

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