Math 128a – Week 11 Worksheet
GSI: Izak, (4/07/21)

5.3 Problems

Use Taylor's method of order two to approximate the solutions for each of the following two initial value problems.

Problem 1. $y' = te^{3t}$, $0 \leq t \leq 1$, $y(0) = 0$, $h = .5$

Problem 2. $y' = \sin(t) + e^{-t}$, $0 \leq t \leq 1$, $y(0) = 0$, $h = .5$

5.4 Problems

Problem 3. *Use modified Euler method to approximate the solution to the following initial-value problem and compare the results to the actual values:* $y' = 1 + y/t$, $1 \leq t \leq 2$, $y(1) = 2$, $h = .25$, $y(t) = t \ln t + 2t$.

Problem 4. *Repeat the above problem using Midpoint method.*

Problem 5. *Repeat the problem with Heun's method*

Problem 6. *Repeat the problem with Runge-Kutta of order four.*

5.6 Problems

Problem 7. *Use two step Adams-Bashforth methods to approximate the solutions to the following initial-value problem. Use exact starting values and compare the results to actual values.*

$y' = te^{3t} - 2y$, $0 \leq t \leq 1$, $y(0) = 0$, $h = .2$. *Actual solution:* $y(t) = \frac{1}{5}te^{3t} - \frac{1}{25}e^{3t} + \frac{1}{25}e^{-2t}$