Math 128A: Worksheet #11

Name: _____   Date: <u>November 16, 2020</u>

<u>Fall 2020</u>

Problem 1. Derive the Adams-Moulton two-step method using divided differences for the interpolating polynomial.

Problem 2 (5.10, #4-ish)**.** Consider the following multistep method to solve the differential equation:

$$w_{i+1} = 4w_i - 3w_{i-1} - 2hf(t_{i-1}, w_{i-1}).$$

Analyze this method for consistency, stability, and convergence.

Problem 3 (5.10, #7). Investigate stability for the difference method

$$w_{i+1} = -4w_i + 5w_{i-1} + 2h[f(t_i, w_i) + 2hf(t_{i-1}, w_{i-1})],$$

for $i = 1, 2, \ldots, N - 1$, with starting values w_0, w_1.

Problem 4. Find the region of absolute stability (RAS) for the midpoint method:

$$w_{i+1} = w_i + hf\left(t_i + \frac{h}{2}, w_i + \frac{h}{2}f(t_i, w_i)\right).$$

Plot the RAS using Matlab.