EXERCISE 2

MAT260, SPRING 2017

Problem 1.

a): Why will always $w = 1$ be a root of $\rho(w) = \sum_{m=0}^{s} a_m w^m$ provided the method is of order $p \geq 1$ and $a_s = 1$?

b): Exercise 2.4 from the textbook

Problem 2. Nyström's methods have $\rho(w) = w^{s-2}(w^2 - 1)$

a): The midpoint method is belong to this class

$$y_{n+2} = y_n + 2hf(t_{n+1}, y_{n+1})$$

Prove that it converge and is of order $p = 2$. Do there exist other 2-step Nyström's method of higher order?

b): Construct the 3-steps Nyström's method of optimal order.

Problem 3. Exercise 2.5 from the textbook.