Norwegian University of Science
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Department of Mathematical
Sciences

TMA4215 Numerical mathematics Autumn 2013

Exercise set 10

1 Set 7, Problem 3, 4 and 5.

2 The initial value problem

$$y' = f(t, y)$$

is to be solved by the following implicit 2-step method

$$y_{n+2} - \alpha_1 y_{n+1} + a y_n = h(\beta_2 f_{n+2} + \beta_1 f_{n+1} + \beta_0 f_n)$$

a) Keep a as a free parameter, and find α_1, β_2, β_1 and β_0 such that the method attain the highest possible order. Find also an expression for the error constant.

b) For which values of a is the method you found in point **a)** convergent?