Name:
CID:

Tutorial 4

Any marks received for the tutorial are only indicative and may be subject to moderation and scaling.

Exercise 1 (Consistency) — % of CW mark: 1.0

If the 3-step Adams–Bashforth method

$$x_{n+1} = x_n + \frac{h}{12}\left(23f_n - 16f_{n-1} + 5f_{n-2}\right)$$

is consistent, calculate its linear difference operator, order of consistency and the error constant.

Exercise 2 (Consistency and convergence) — % of CW mark: 1.0

If the method

$$x_{n+1} - x_n = 2hf_n$$

is convergent for $x' = f(t, x)$, calculate the order of consistency and the error constant.

Exercise 3 (Consistency and convergence) — % of CW mark: 2.0
Mastery Component

Study how the order of consistency of the method

$$x_{n+2} = bx_n - (b-1)x_{n+1} + \frac{h}{4}\left((b+3)f_{n+2} + (3b+1)f_n\right)$$

depends on the parameter $b \in \mathbb{R}$. What are the first and second characteristic polynomials of the method?