

Assignment 5, due Friday, 5th November

Theoretical:

1. Prove that the backward differentiation formula (BDF) for $s = 3$,

$$w_{n+3} - \frac{18}{11}w_{n+2} + \frac{9}{11}w_{n+1} - \frac{2}{11}w_n = \frac{6}{11}f(t_{n+3}, w_{n+3}),$$

is convergent.

2. Find the explicit form of the BDF for $s = 4$.
3. An s -step with $\sigma(w) = w^{s-1}(w + 1)$ and order s might be superior to a BDF in some situations. Find a general formula for ρ and β . Then, derive explicitly such methods for $s = 2$ and $s = 3$.

Computational:

No computation this week!