

1.
  - a. Atkinson uses quite specialized procedures to obtain the coefficients in the Adams-Bashforth formulas in his Table 6.11 and the Adams-Moulton formulas in Table 6.13 (cf. Problem 2 below). Generate these same formulas by instead using the Padé weights algorithm (in Mathematica). You can ignore the error estimates that Atkinson's tables also contain.
  - b. Draw illustrations (as in class), showing the 'shapes' of the stencils for the AB3 and AM3 schemes (3<sup>rd</sup> order accurate versions of the Adams-Bashforth and Adams-Moulton formulas, respectively).
2. Derive the coefficients in the AB3 scheme by means of
  - a. Explicitly integrating over  $[0, h]$  the interpolation polynomial for  $f$  over the nodes  $x = \{-2h, -h, 0\}$ .
  - b. Use the entries in Atkinson's Table 6.10 together with equation (6.7.22) (no need to derive either of these – just 'plug and chug').
3. Solve Problem 6 in Atkinson, page 451. Write your Matlab program so that  $y$  can be a column vector with any number of entries.
4. Reusing the program from Problem 3 above, solve Problem 12 in Atkinson, page 452.