Homework 2 - Computational Part

Consider the ODE

\[ u' = -u^2 \quad u(0) = 1. \]

This is called the Riccati equation.

1. Show that the solution to this equation is \( u(t) = (1 + t)^{-1} \).

2. Solve this equation using Adam-Bashforth methods of 1st, 2nd and 3rd order - confirm expected order of convergence of methods at \( T = 10 \) and compare with the results in the book (Fig 2.1, p. 21)

3. Solve this equation using Adam-Moulton methods of 1st, 2nd and 3rd order - confirm expected order of convergence of methods at \( T = 10 \) and compare with the results in the book (Fig 2.1, p. 21)