Mathematical Fundamentals for Electrochemical Energy Storage Systems

Exercise 6

Task 1: ODE solver methods

a) Solve the following equation with the following methods and compare the performance of different methods by measuring the error

- $\frac{5dy}{dx} - y^2 = -x^2; with\ y(0) = 1$

Solve this equation using the following methods implemented in python. Compare the performance of these methods with your implementation by measuring the error. i. Forward eulers method ii. Backwards eulers method iii. Adams method iv. Runge Kutta 4th order

b) Use the scipy library to solve the equations above. Which of the options of the scipy library gives you the best result?