

## NMA – homework from week 4

### 1. Explicit and implicit Euler's method

Consider Cauchy problem

$$y' = -2y + 2x, \quad y(0) = 2.$$

- (a) Find the interval of maximal solution.
- (b) Choose step-size  $h = 0.25$  and using explicit Euler method compute approximate value of  $y(0.5)$ .
- (c) Choose step-size  $h = 0.5$  and using implicit Euler method compute approximate value of  $y(0.5)$ .

### 2. Midpoint (Collatz) method

Consider Cauchy problem

$$y' = -y + x, \quad y(0) = -1.$$

- (a) Find the interval of maximal solution.
- (b) Choose step-size  $h = 0.5$  and using the midpoint method compute approximate value of  $y(0.5)$ .