

NMA – homework from week **11**

Consider mixed problem for wave equation

$$\frac{\partial^2 u}{\partial t^2} = 4 \frac{\partial^2 u}{\partial x^2} + xt \quad \text{on } \Omega = \{[x, t] : x \in (0, 3), t > 0\},$$
$$u(x, 0) = 0, \quad \frac{\partial u}{\partial t}(x, 0) = 1, \quad u(0, t) = 5t^2 + t, \quad u(3, t) = \sin t$$

- a) Choose spatial step-size $h = 0.5$ and time step-size $\tau = 0.2$ and find an approximate value of $u(0.5, 0.4)$ using the explicit scheme.
- b) Will the explicit scheme be stable for the choice of $h = 0.5$ and $\tau = 0.2$? Give reasons for your answer.