

Practice 1

Consider the following vibration model:

$$\frac{d^2 y}{dt^2} + K \frac{dy}{dt} - b = 0, \quad (1)$$

where the term $K \frac{dy}{dt}$ represents the damping force proportional to the velocity $\frac{dy}{dt}$.

Initial conditions are written as

$$y(t=0) = 0, \quad \frac{dy}{dt}(t=0) = 0. \quad (2)$$

Let $K = 10^{-3}$, $b = 10$.

Tasks. Solve model (1) with initial conditions (2):

- 1) analytically, draw a graph of $y(t)$;
- 2) numerically using the finite difference method, draw a graph of $y(t)$.
- 3) Compare the results obtained, i.e., plot the curves of the exact (analytical) and numerical solutions on a single figure.

(4 points)