

Laborator 6. Metodele Runge-Kutta, shooting si ode din matlab

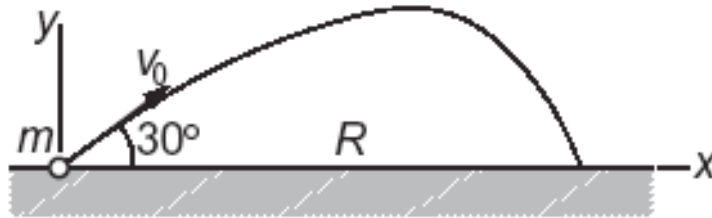
1. Rezolvați problema bilocala neliniara folosind o metoda de tip Runge-Kutta de ordin 4 si o tehnica de tip shooting

$$y'' = -(y')^2 - y + \ln x, \quad 1 \leq x \leq 2, \quad y(1) = 0, \quad y(2) = \ln 2.$$

Comparati cu solutia exacta:

$$y = \ln x.$$

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A ball of mass $m = 0.25$ kg is launched with the velocity $v_0 = 50$ m/s in the direction shown. Assuming that the aerodynamic drag force acting on the ball is $F_D = C_D v^{3/2}$, the differential equations describing the motion are

$$\ddot{x} = -\frac{C_D}{m} \dot{x} v^{1/2} \quad \ddot{y} = -\frac{C_D}{m} \dot{y} v^{1/2} - g$$

where $v = \sqrt{\dot{x}^2 + \dot{y}^2}$. Determine the time of flight and the range R . Use $C_D = 0.03$ kg/(m·s)^{1/2} and $g = 9.80665$ m/s².