Modeliranje prostega pada padalca

Začetni problem višjega reda:

$$y^{(k)}(x) = f(x, y(x), y'(x), \dots, y^{(k-1)}(x))$$

$$y(a) = y_a,\ y'(a) = y_a',\ \dots,\ y^{(k-1)}(a) = y_a^{(k-1)}$$

$$y_1 = y;\ y_2 = y';\ \dots,\ y_k = y^{(k-1)}$$

$$y_1' = y' = y_2$$
$$y_2' = y'' = y_3$$
$$\vdots$$
$$y_{k-1}' = y^{(k-1)} = y_k$$
$$y_k' = y^{(k)} = f(x, y_1, y_2, \dots, y_k)$$
$$y_1(a) = y_a,\ y_2(a) = y_a',\ \dots,\ y_k(a) = y_a^{(k-1)}$$

Začetni problem 1. reda (sistem!!!)

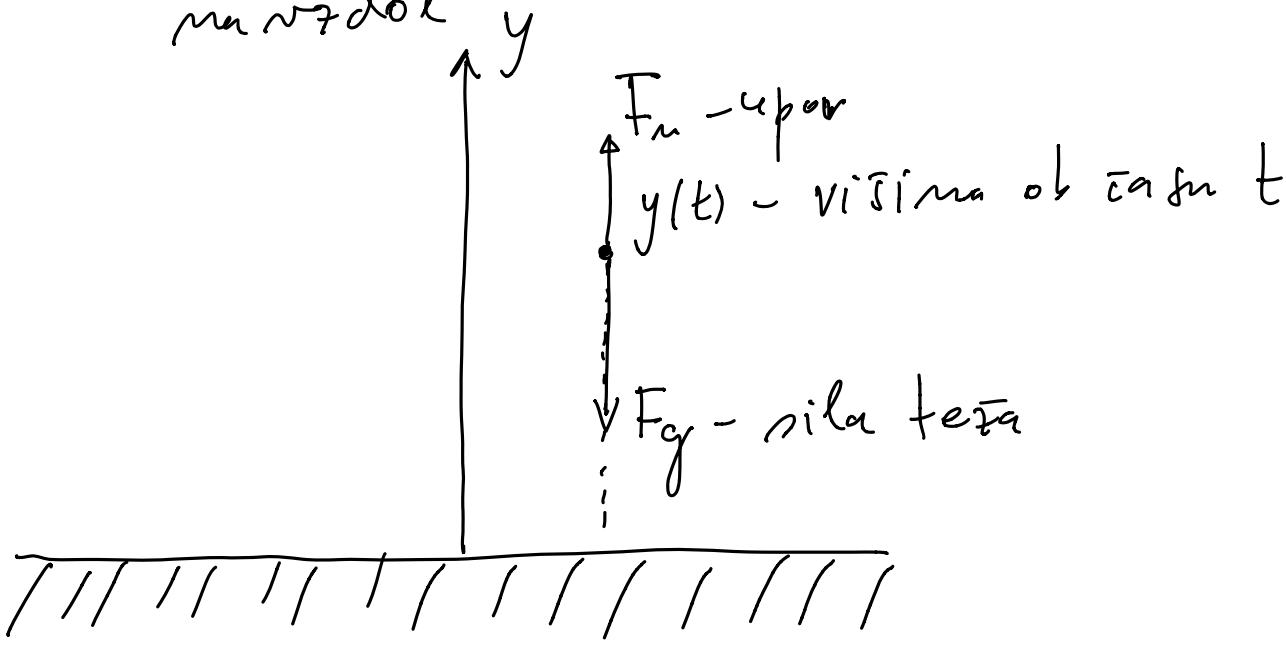
Model padalca:

- gostota zraka in pospešek sta konstanti

- upoštevamo kvadratični zakon upora ($F_u \propto v^2$

- padalca padalca gj navpično

- padalec se spusti iz helikopterja navzdol



$$m\ddot{y} = F_g + F_u = -mg + \alpha \cdot \dot{y}|\dot{y}|$$

$$= -mg + \alpha \cdot \dot{y}^2$$

$$= -mg + \frac{1}{2}\rho_z \cdot S \cdot c_u \dot{y}^2 \;/\, m$$

$$\ddot{y} = -g + \frac{1}{2}\frac{\rho_z \cdot S \cdot c_u}{m}\dot{y}^2$$

$\rho_z = 1{,}3\ kg/m^3$, $S = 1\ m^2$; $c_w = 1$, $m = 90\ kg$