

DGL definieren

$$\ddot{x} = -g - \frac{b}{m} \dot{x}^2 \operatorname{sign}(\dot{x})$$

$$Y = \begin{pmatrix} Y_1 \\ Y_2 \end{pmatrix} = \begin{pmatrix} \dot{x} \\ x \end{pmatrix}$$

$$\dot{Y} = \begin{pmatrix} \dot{x} \\ x \end{pmatrix} = \underbrace{\begin{pmatrix} Y_2 \\ -g - \frac{b}{m} Y_2^2 \operatorname{sign}(Y_2) \end{pmatrix}}_{f(t, Y)}$$

Runge-Kutta-Schnitt

$$k_1 = f(t, Y)$$

$$k_2 = f\left(t + \frac{1}{2}h, Y + h \cdot \frac{1}{2}k_1\right)$$

$$k_3 = f\left(t + \frac{2}{3}h, Y + h\left(-\frac{1}{3}k_1 + k_2\right)\right)$$

$$k_4 = f\left(t + h, Y + h(k_1 - k_2 + k_3)\right)$$

$$k = \frac{1}{6}(k_1 + 3k_2 + 3k_3 + k_4)$$

$$Y(t+h) = Y(t) + h k$$