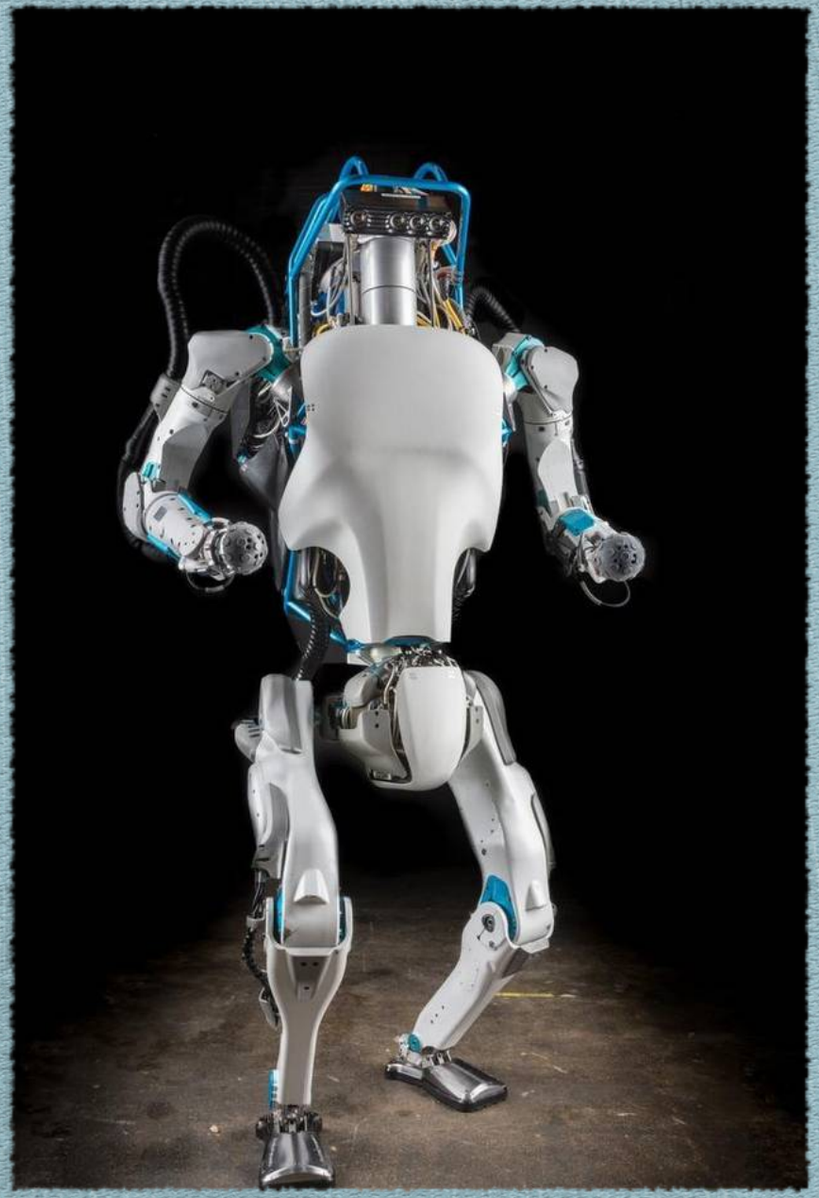
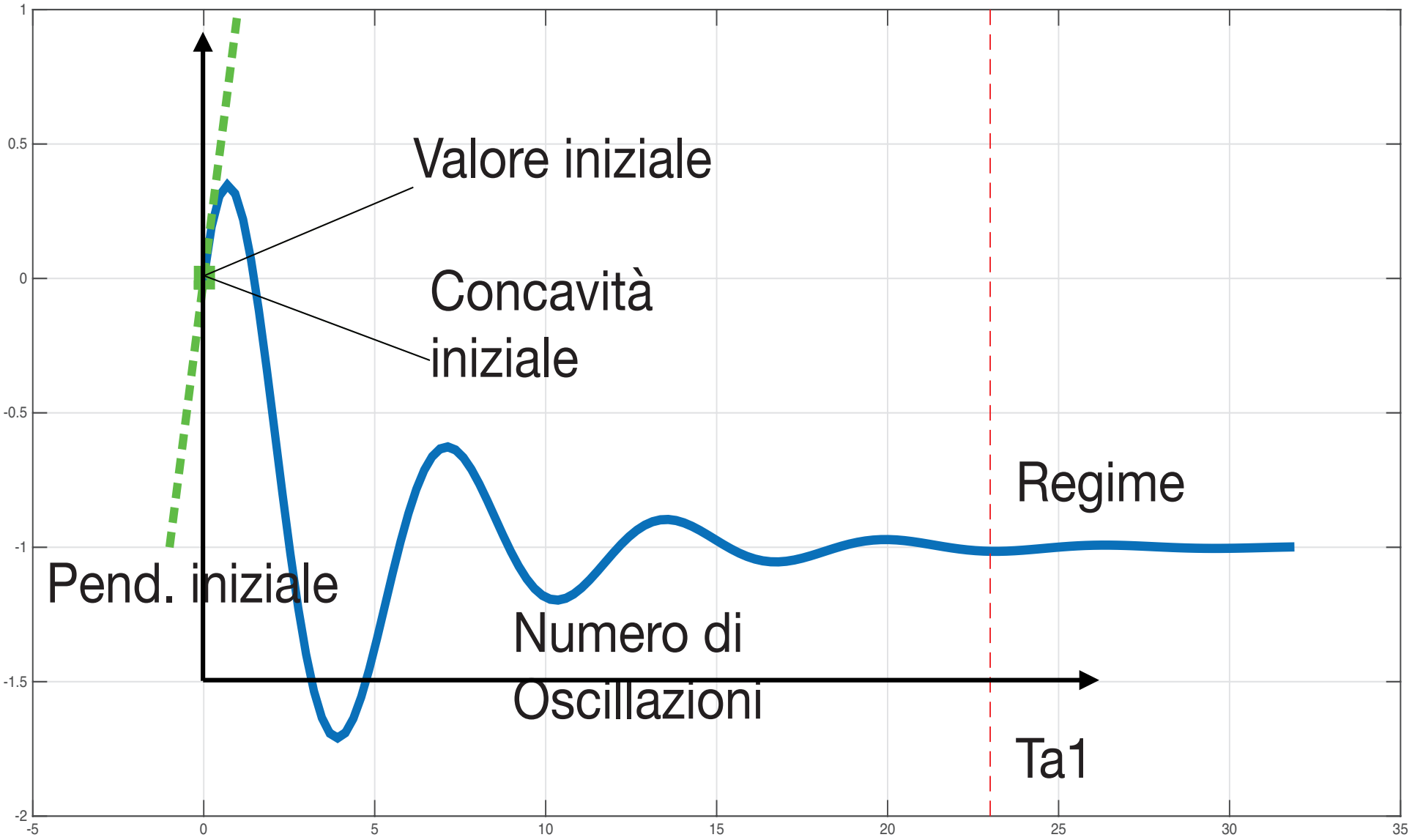


Automatica

A.A. 2023/2024

RISPOSTA QUALITATIVA

ESEMPIO INTRODUTTIVO



ESERCIZIO #1

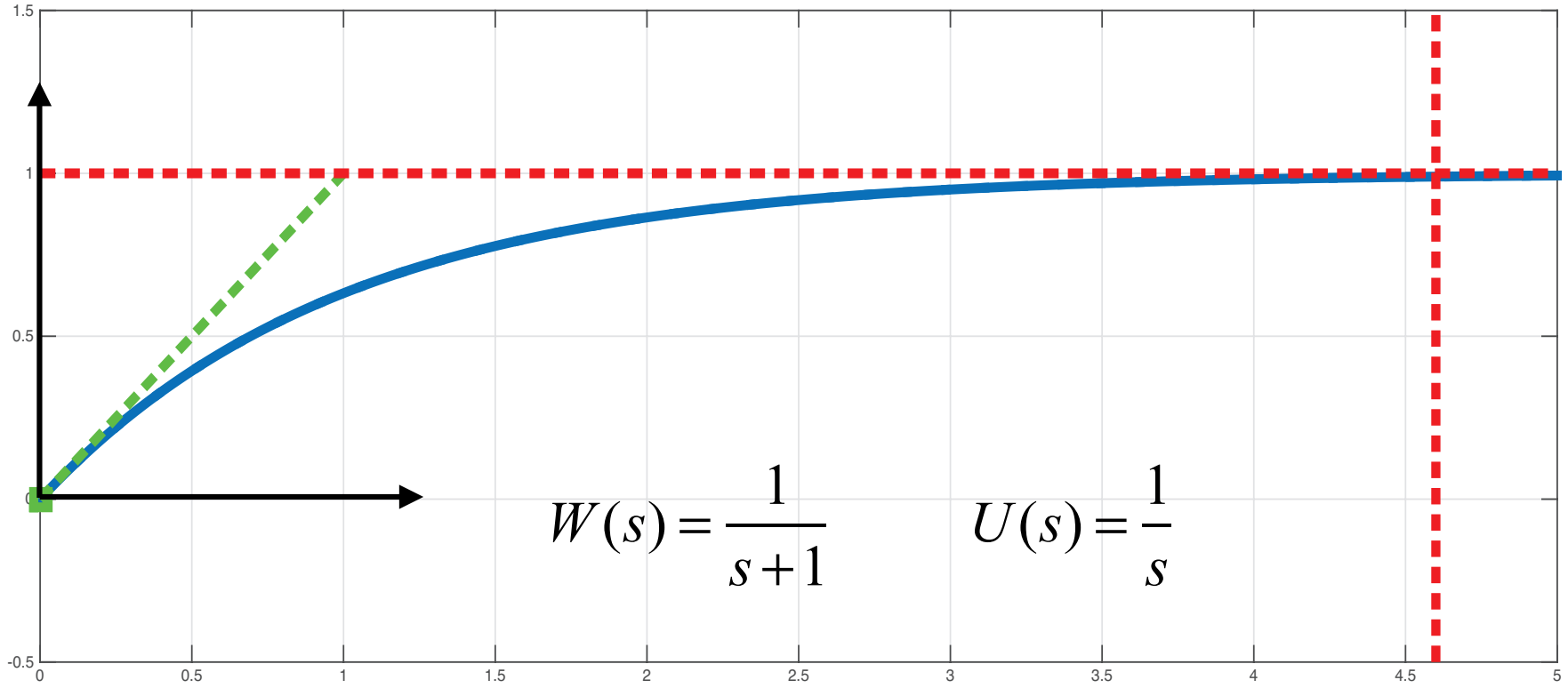
$$y(0) = \lim_{s\to\infty} sY(s) = 0$$

$$\dot{y}(0) = \lim_{s\to\infty} s\left[sY(s) - y(0)\right] = 1$$

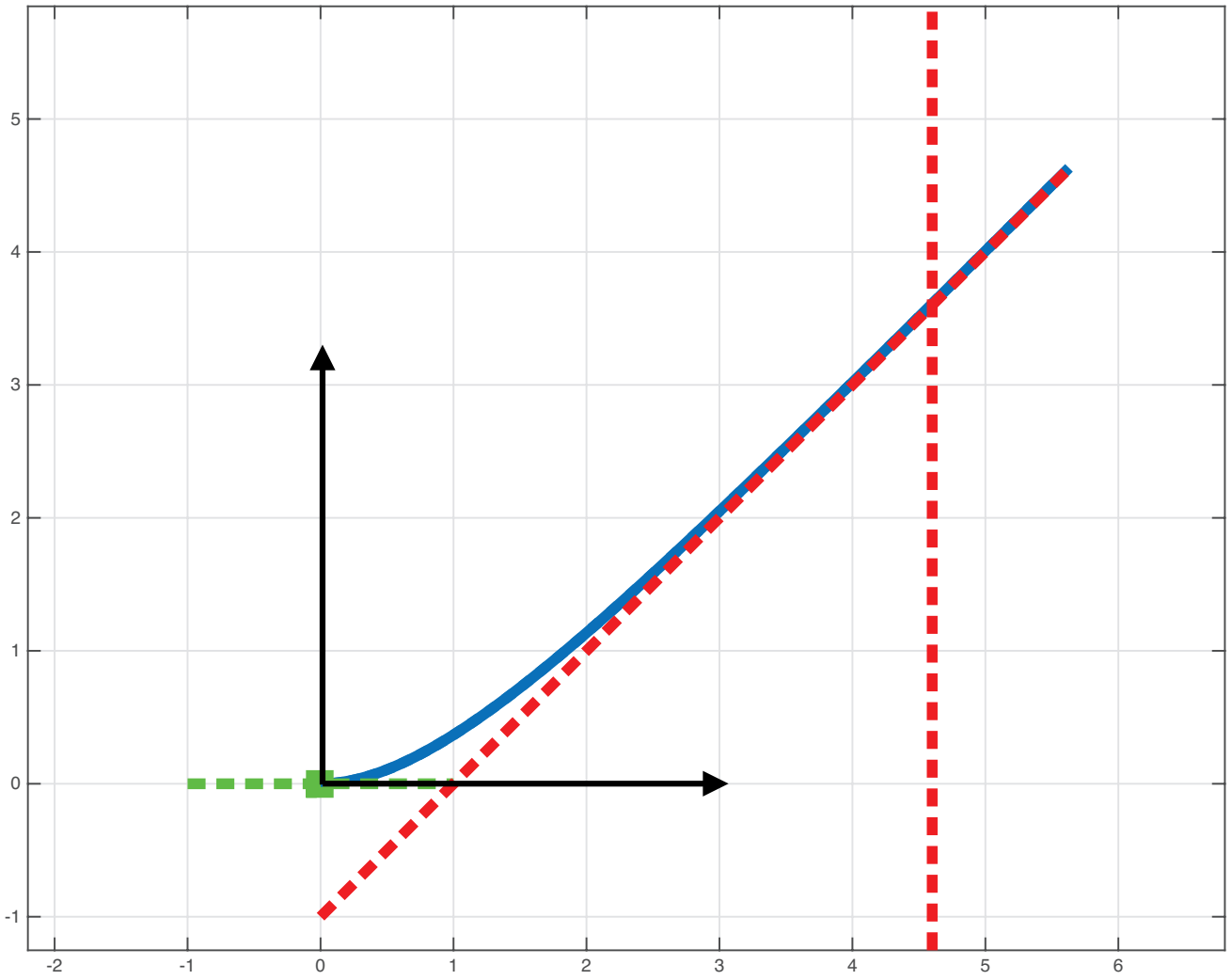
$$\ddot{y}(0) = \lim_{s\to\infty} s\left[s\left(sY(s) - y(0)\right) - \dot{y}(0)\right] < 0$$

$$y_\infty(t) = 1$$

$$T_{a1} = 4.6$$



ESERCIZIO #2



$$W(s) = \frac{1}{s+1}$$

$$U(s) = \frac{1}{s^2}$$

$$y(0) = 0$$

$$\dot{y}(0) = 0$$

$$\ddot{y}(0) > 0$$

$$y_\infty(t) = t - 1$$

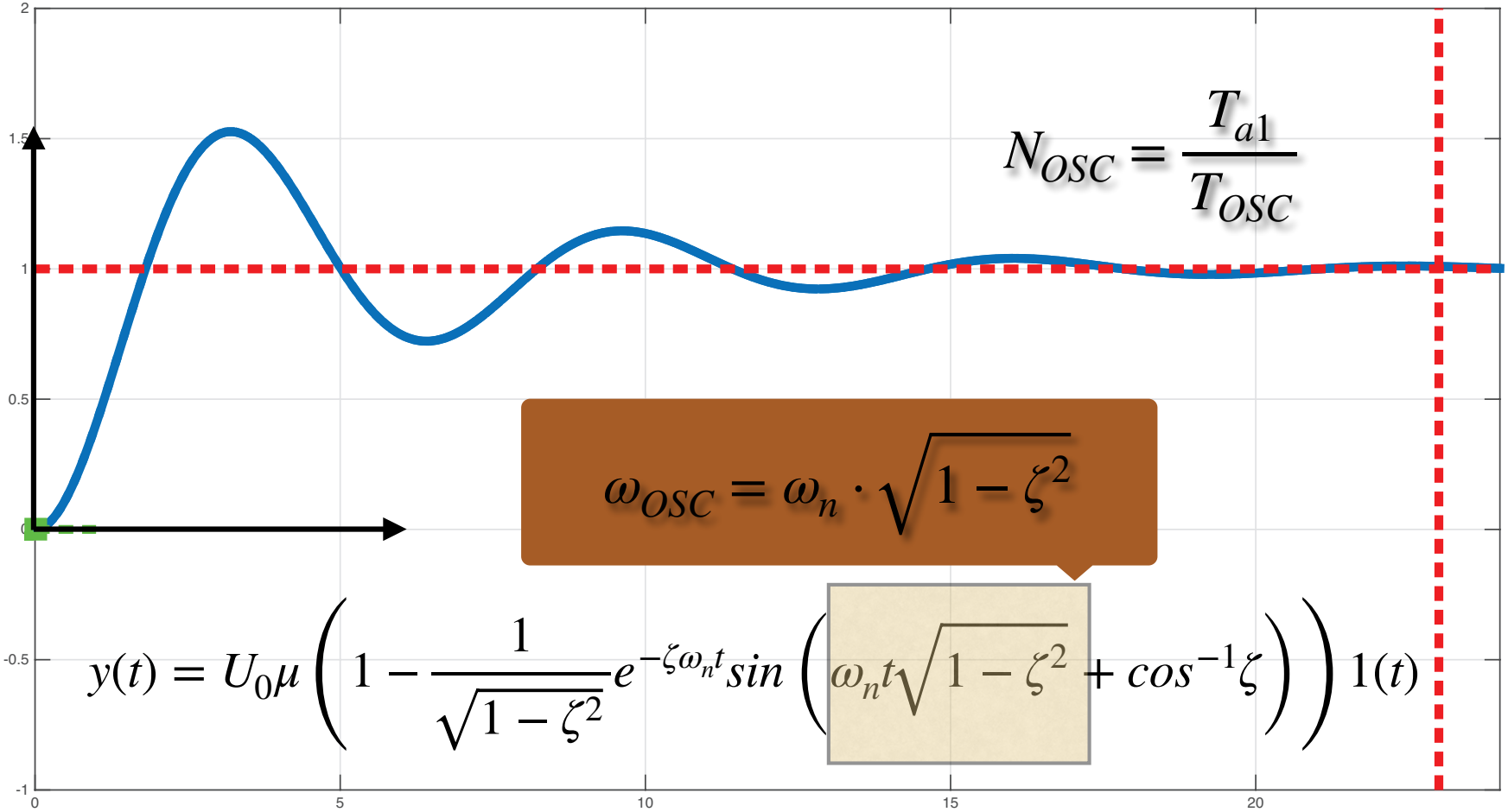
$$T_{a1} = 4.6$$

ESERCIZIO #3

$$W(s)=\frac{1}{s^2+.4s+1} \qquad U(s)=\frac{1}{s}$$

$$y(0)=0 \quad \ddot{y}(0)>1 \quad T_{a1}=23$$

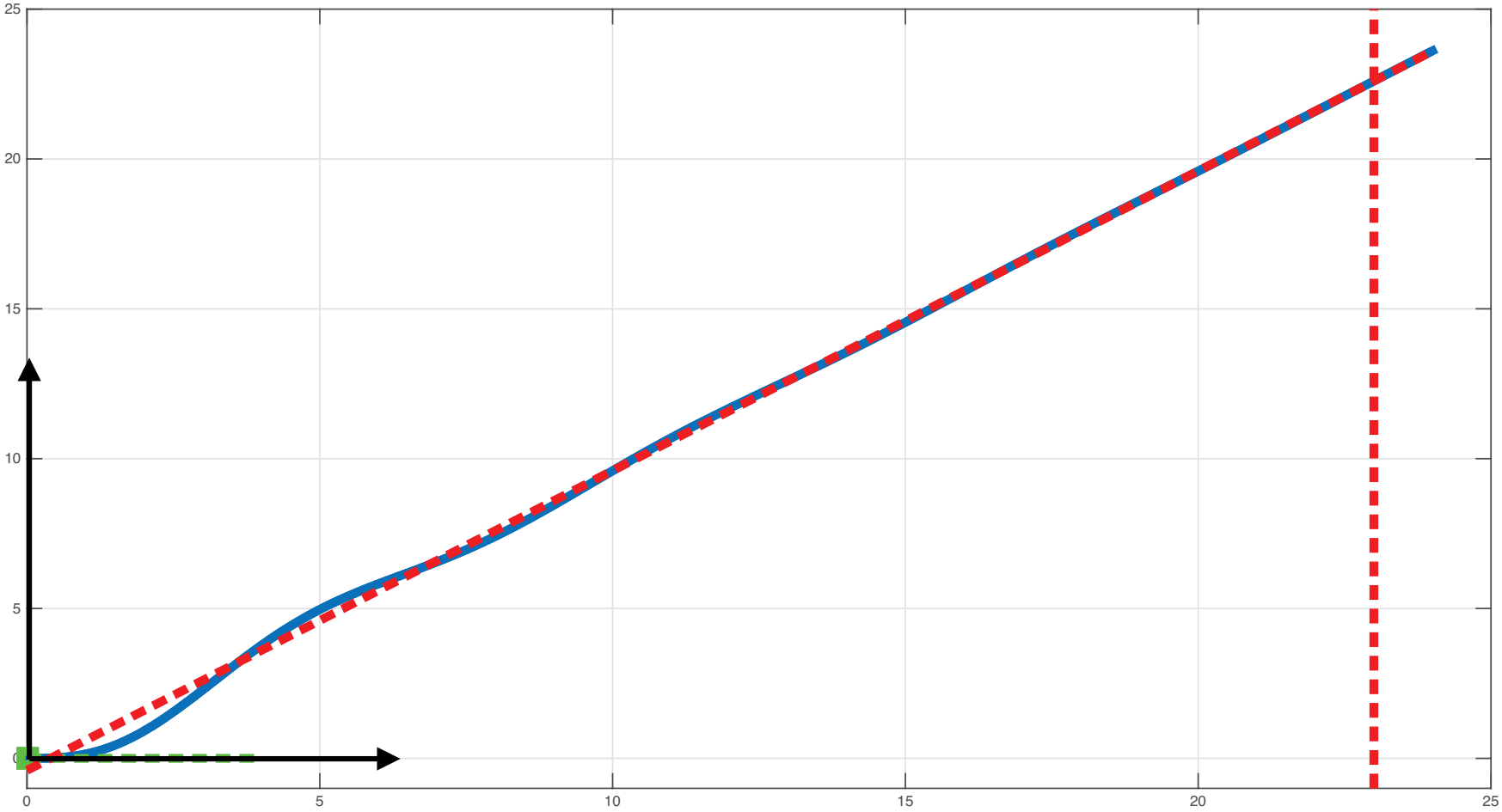
$$\dot{y}(0)=0 \quad y_\infty(t)=1 \quad N_{osc}=3.58$$



ESERCIZIO #4

$$W(s)=\frac{1}{s^2+.4s+1}, U(s)=\frac{1}{s^2} \qquad y(0)=0 \quad \dot{y}(0)=0 \quad \ddot{y}(0)=0 \qquad T_{a1}=23$$

$$y_\infty(t)=t-0.4 \qquad N_{osc}=3.58$$

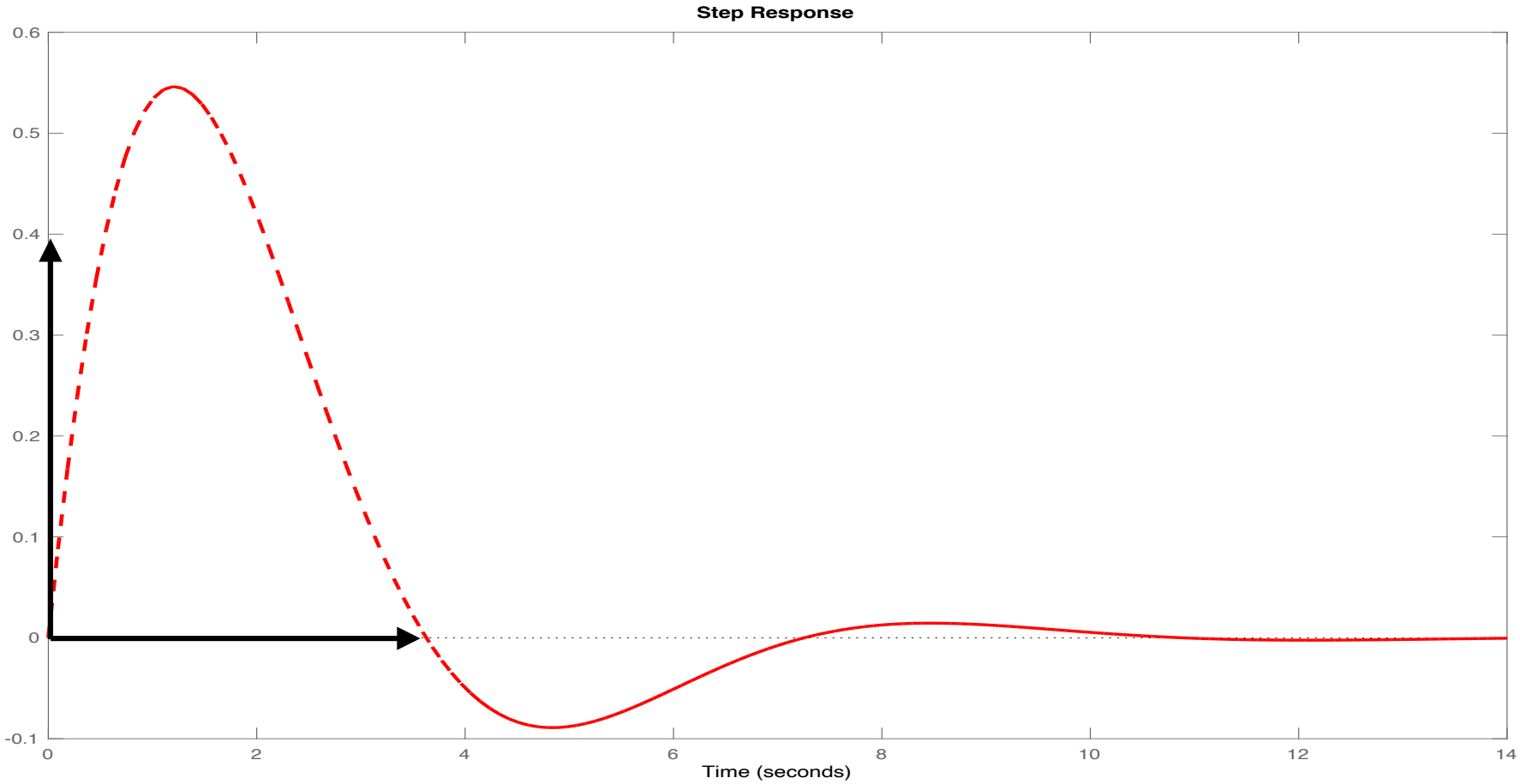


ESERCIZIO #5

$$W(s)=\frac{s}{s^2+s+1}, U(s)=\frac{1}{s}$$

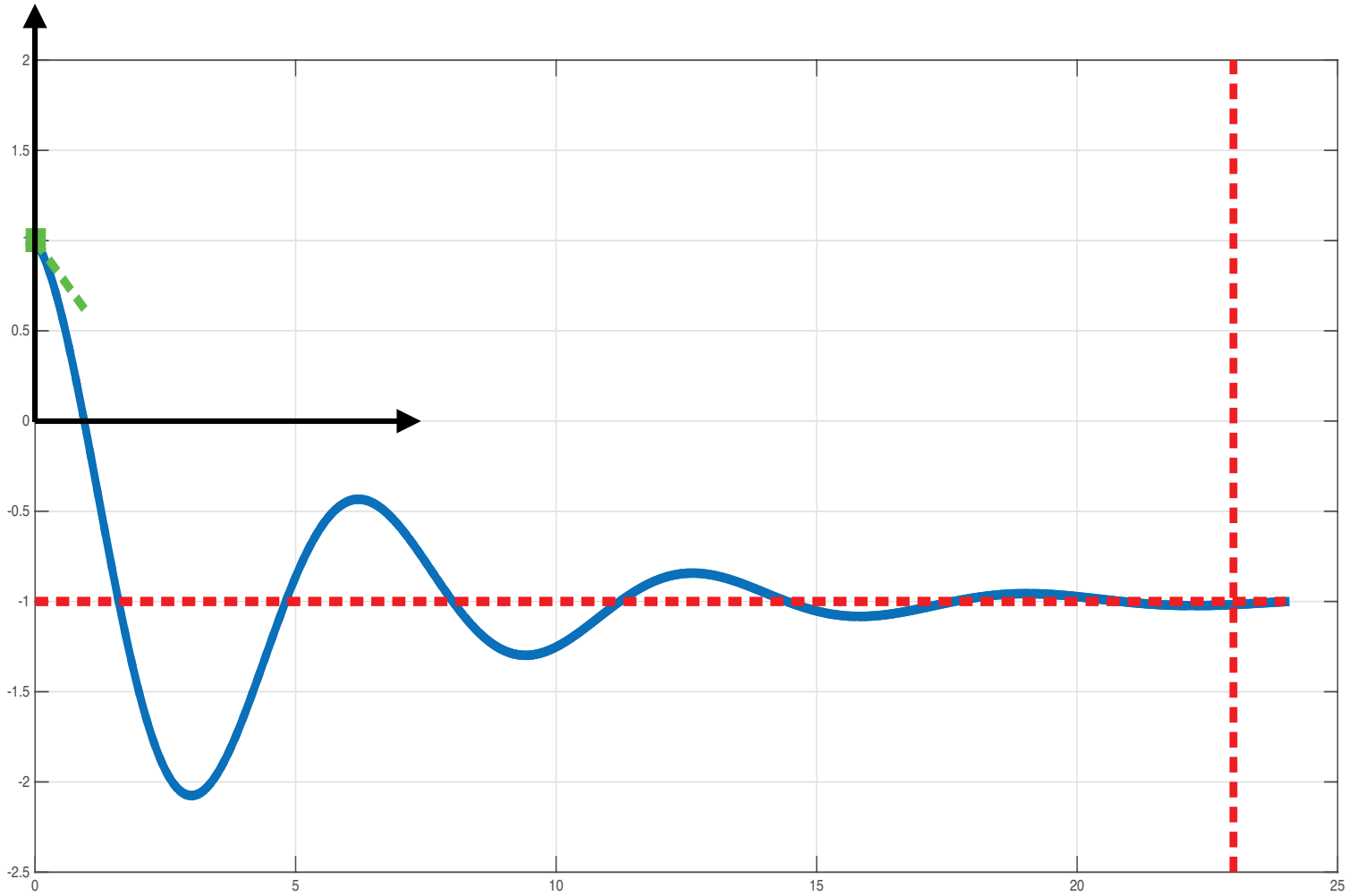
$$y(0)=0 \quad \ddot{y}(0)<0 \quad T_{a1}=9.2$$

$$\dot{y}(0)=1 \quad y_\infty(t)=0 \quad N_{osc}=1.26$$



ESEMPIO #6

$$W(s) = \frac{(s+1)(s-1)}{s^2 + .4s + 1} \qquad U(s) = \frac{1}{s}$$



$$y(0) = 1$$

$$\dot{y}(0) = -0.4$$

$$\ddot{y}(0) < 0$$

$$y_\infty(t) = -1$$

$$T_{a1} = 23$$

$$N_{osc} = 3.58$$