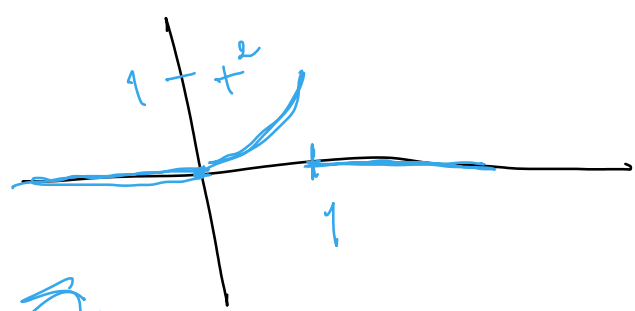


2.09*

torsdag 25 januari 2024

14:39



$$\begin{aligned} t < 0, & f(t) = 0 \\ 0 \leq t < 1, & f(t) = t^2 \\ t \geq 1, & f(t) = 0 \end{aligned}$$

$$t^2 \theta(t) = \begin{cases} t^2, & t \geq 0 \\ 0, & t < 0 \end{cases}$$

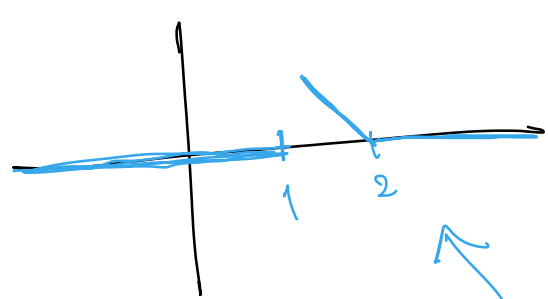
$$0 + 0, \quad t < 0$$

$$t^2 + 0, \quad 0 \leq t < 1$$

$$t^2 - t^2, \quad t \geq 1$$

$$-t^2 \theta(t-1) = \begin{cases} -t^2, & t \geq 1 \\ 0, & t < 1 \end{cases}$$

$$t^2 \theta(t) - t^2 \theta(t-1) = t^2 (\theta(t) - \theta(t-1))$$



$$\begin{aligned} t < 1, & f(t) = 0 \\ 1 \leq t < 2, & f(t) = 2-t \\ t \geq 2, & f(t) = 0 \end{aligned}$$

$$(2-t) \theta(t-1) = \begin{cases} 2-t, & t \geq 1 \\ 0, & t < 1 \end{cases}$$

$$(t-2) \theta(t-2) = \begin{cases} t-2, & t \geq 2 \\ 0, & t < 2 \end{cases}$$

$$(2-t) \theta(t-1) + (t-2) \theta(t-2)$$

$f(t)$ har inga spring: $0 \leq t < 1, 1 \leq t < 2, t \geq 2$

$$f(t) = t^2 (\theta(t) - \theta(t-1)) + (2-t) (\theta(t-1) - \theta(t-2))$$

$$\frac{d}{dt} t^2 = 2t$$

$$\frac{d}{dt} \theta(t) = \delta(t)$$

$$\frac{d}{dt} \theta(t-1) = \delta(t-1)$$

$$\frac{d}{dt} (2-t) = -1$$

$$\frac{d}{dt} \theta(t-2) = \delta(t-2)$$

Satz 2.1

$$\begin{aligned} f'(t) &= 2t (\theta(t) - \theta(t-1)) - (\theta(t-1) - \theta(t-2)) = \\ &= f'_p(t) \end{aligned}$$

$$0 \leq t < 1, \quad f'(t) = 2t(1-0) - (0-0) = 2t$$

$$1 \leq t < 2, \quad f'(t) = 2t(1-1) - (1-0) = -1$$

$$t < 0, \quad f'(t) = 0 \quad ; \quad t \geq 2, \quad f'(t) = 0$$

det finns spring i punkten $t=1, 2$

$$t=1 \Rightarrow (-1) - 2 = -3$$

$$t=2 \Rightarrow 0 - (-1) = 1$$

för $f'(t)$
och sätter in
i högra funktion-
vänstra funktion

$$\frac{d}{dt} 2t = 2 \quad \frac{d}{dt} -1 = 0$$

$$f''(t) = 2(\theta(t) - \theta(t-1)) - 3\delta(t-1) + \delta(t-2)$$

$$= f''_p(t) + b_1 \delta(t-a_1) + b_2 \delta(t-a_2)$$

$$\text{Sv: } f'(t) = 2t(\theta(t) - \theta(t-1)) - (\theta(t-1) - \theta(t-2))$$

$$f''(t) = 2(\theta(t) - \theta(t-1)) - 3\delta(t-1) + \delta(t-2)$$