

Exo 1

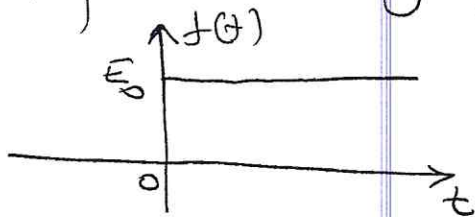
soit le signal échelon  $f(t)$   
avec  $f(t) = E_0 u(t)$ .

Représenter graphiquement et  
Calculer le produit de convolution

$$y(t) = f(t) * f(t)$$

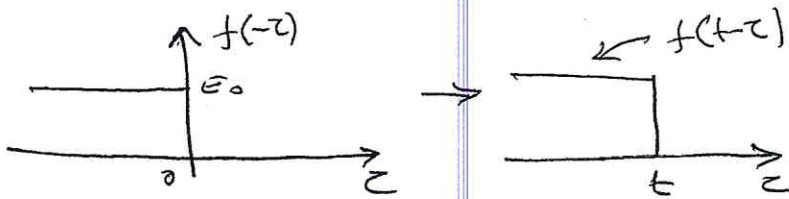
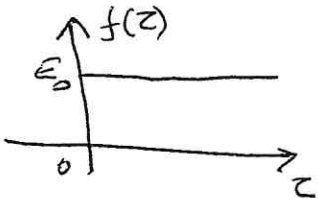
solution

• Représentation graphiquement

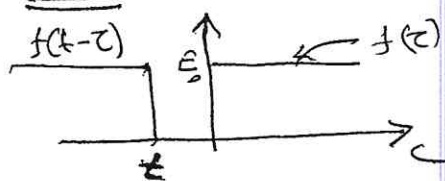


• Le produit de convolution

$$y(t) = \int_{-\infty}^{+\infty} f(\tau) \cdot f(t-\tau) \cdot d\tau$$

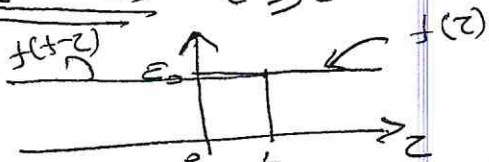


1<sup>er</sup> Cas  $t < 0$



$$y(t) = 0$$

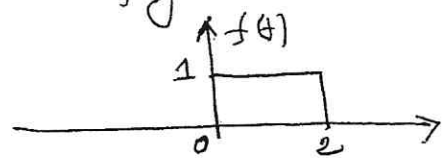
2<sup>em</sup> Cas  $t \geq 0$



$$y(t) = \int_0^t E_0 \cdot d\tau \Rightarrow y(t) = E_0 \cdot t$$

Exo 2

soit le signal  $f(t)$  représenté  
par la figure suivante



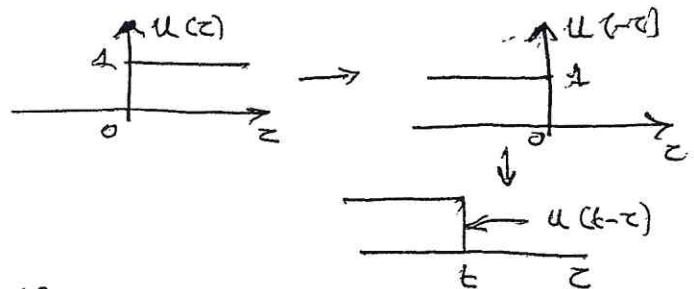
Calculer le produit  
de convolution

$$y(t) = f(t) * u(t)$$

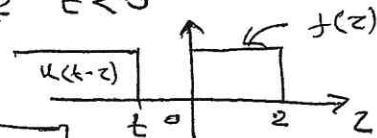
avec :  $u(t)$  : échelon unitaire

solution

$$y(t) = \int_{-\infty}^{+\infty} f(\tau) \cdot u(t-\tau) \cdot d\tau$$

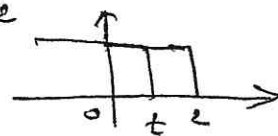


1<sup>er</sup> Cas  $t < 0$



$$y(t) = 0$$

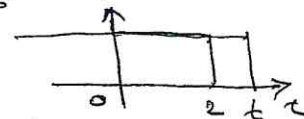
2<sup>em</sup> Cas  $0 \leq t \leq 2$



$$y(t) = \int_0^t 1 \cdot d\tau \Rightarrow y(t) = \tau \Big|_0^t = t$$

$$y(t) = t$$

3<sup>em</sup> Cas  $t \geq 2$



$$y(t) = \int_0^2 1 \cdot d\tau \Rightarrow y(t) = 2$$

