2016 10 19

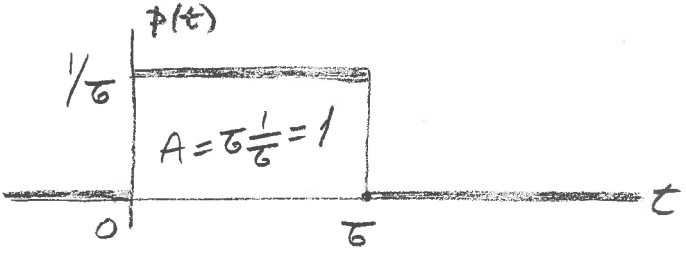
Step function, $1(t)$

$$f(t) = 1(t) = \begin{cases} 1 & 0 < t \\ 0 & t < 0 \end{cases}$$

The step function is also known as the Heaviside function.

Pulse function, $\not{p}(t)$

Pulse function consists of a step up at $t = 0$ followed by a step down at $t = \tau$. The amplitude is $1/\tau$ such that the area under the pulse function is constant and equal to unity ($A = 1$).



$$f(t) = \not{p}(t;\tau) = \begin{cases} \frac{1}{\tau}, & 0 < t < \tau \\ 0, & \text{else} \end{cases}$$

t = variable

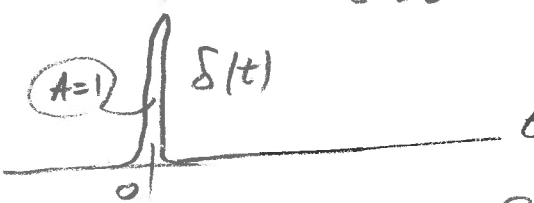
τ = parameter

Impulse function $\delta(t)$

Impulse function $\delta(t)$ is also known as "Dirac function" or "Dirac delta function" or "Dirac impulse function" or "delta function" or "δ function"

Impulse function $\delta(t)$ is obtained from the pulse function $p(t;\tau)$ by letting τ become infinitesimally small, i.e.,

$$\delta(t) = \lim_{\tau \to 0} p(t;\tau)$$

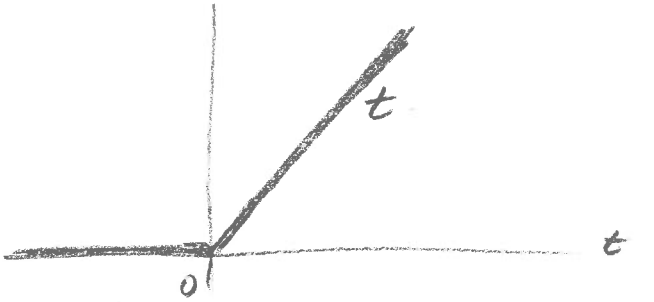


$$A = \int_{-\infty}^{\infty} \delta(t)\, dt = 1$$

The area under the δ function is equal to unity ($A=1$) just like in the pulse function $p(t;\tau)$.

Ramp function, $f(t) = t$, $t > 0$

The ramp function is zero for $t < 0$ and equal to t for $t > 0$



$$f(t) = \begin{cases} t, & t > 0 \\ 0, & t < 0 \end{cases}$$