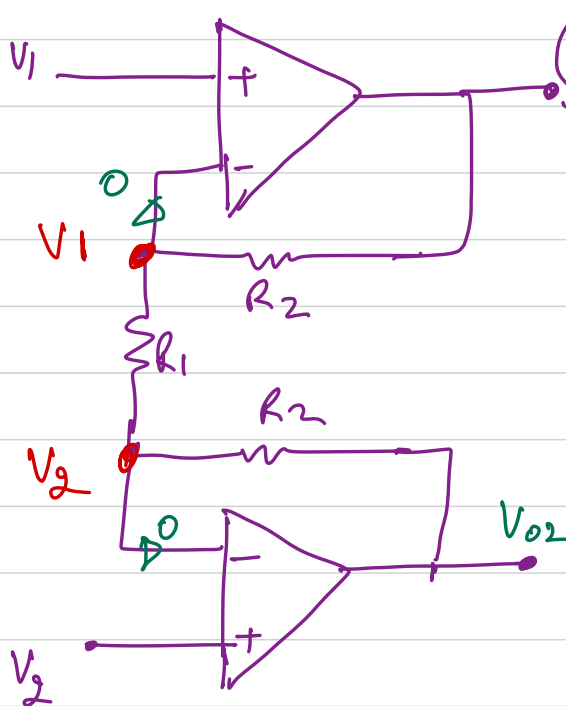


$R_2 \gg R_1 \rightarrow \text{approx}$

Instrumentation Amplifier



$$V_{01} = V_1 \left(1 + \frac{R_2}{R_1} \right)$$

$$\left(\frac{R_2(V_1 - V_2)}{R_1} + \frac{V_1}{R_1} \right) \rightarrow 170$$

$$\left(1 + \frac{2R_2}{R_1} \right) (V_1 - V_2) = V_{01} - V_{02}$$

$$V_1 \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} - \frac{V_{01}}{R_2} - \frac{V_2}{R_1} = 0$$

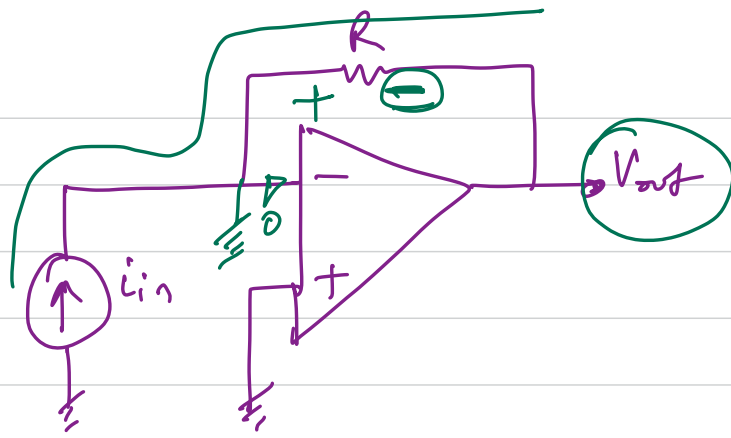
$$V_2 \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} - \frac{V_{02}}{R_2} - \frac{V_1}{R_1} = 0$$

180

~~170~~

→ 146

→ 170



$$V_{out} = -i_{in} R$$

Trans-impedance

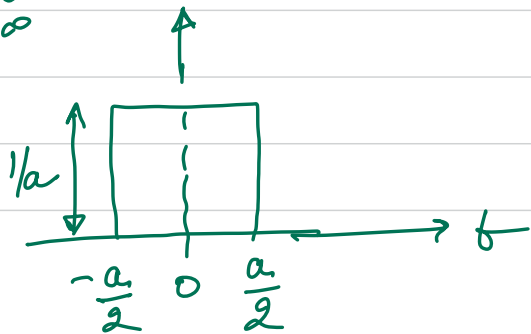
$$\frac{V_{in}}{I_{in}} = \left\{ \text{Impedance} \right\} = (Z_{in})$$



Unit Impulse

$$\delta(t) = \begin{cases} 0 & t \neq 0 \\ \text{undefined} & t = 0 \end{cases}$$

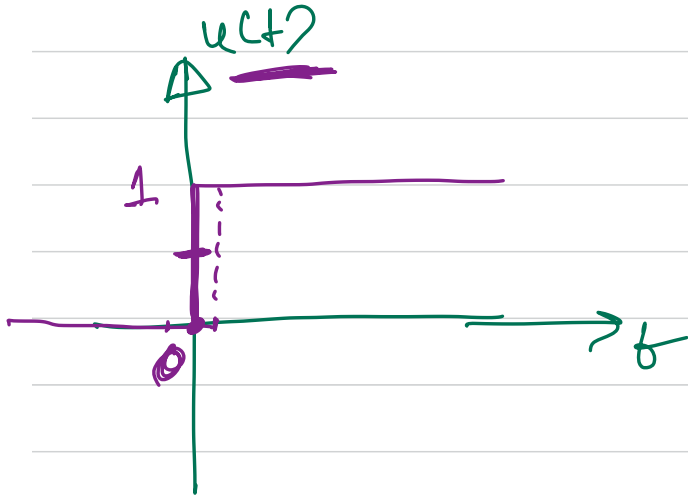
$$\int_{-\infty}^{\infty} \delta(t) dt = 1$$



$a \rightarrow 0$

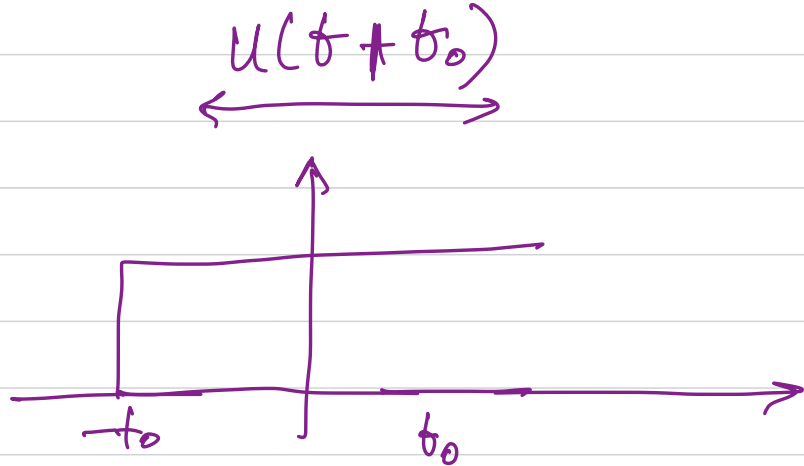


Unit step : $u(t) = \begin{cases} 1 & t > 0 \\ 0 & t < 0 \end{cases}$



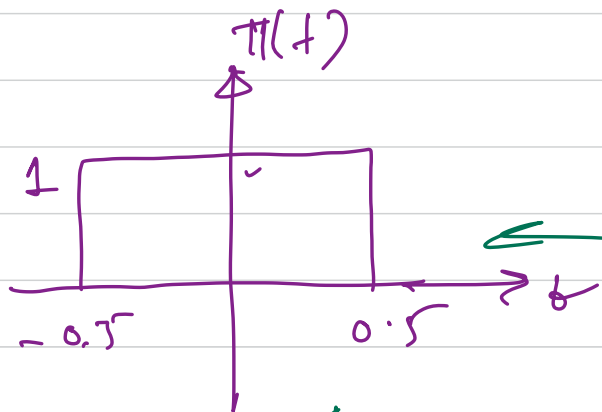
$$x(t) = u(t - 4)$$

$$x(4) = u(0)$$



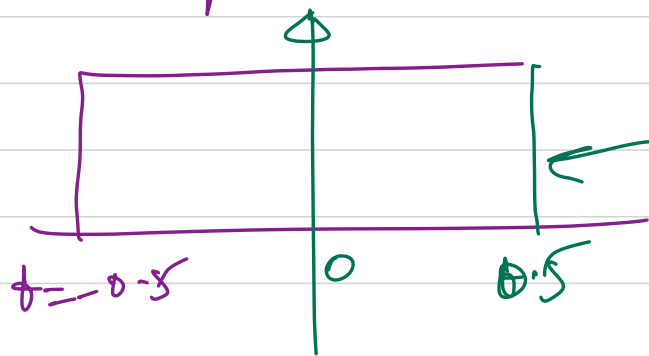
Unit pulse
←→

$$\pi(t) = \begin{cases} 1 & |t| < 1/2 \\ 0 & |t| > 1/2 \end{cases}$$



$$\pi(t) = u(t + \frac{1}{2}) - u(t - \frac{1}{2})$$

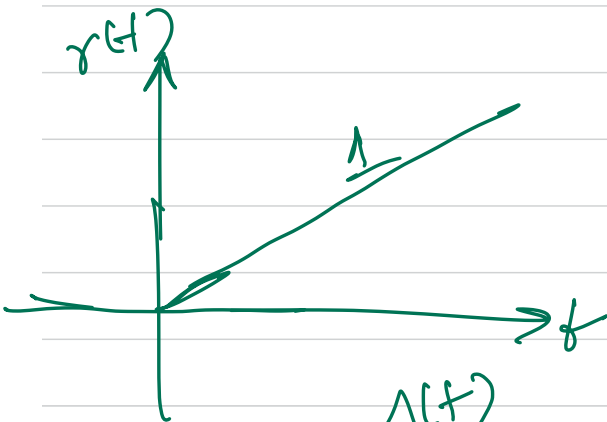
←→ ←→



$\left\{ \begin{array}{l} u(t) \rightarrow \text{basic building} \\ f(t) \rightarrow \end{array} \right.$

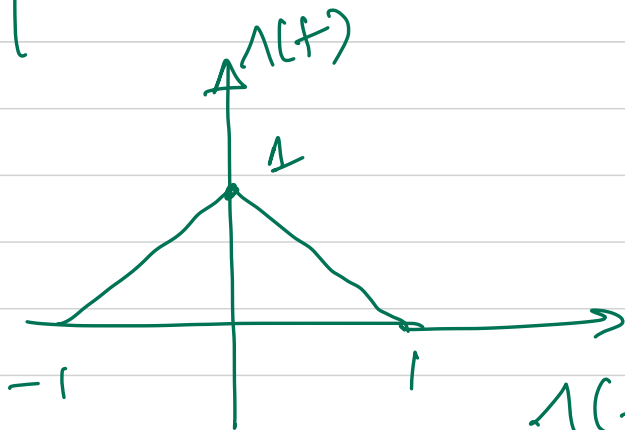
"Unit ramp"

$$r(t) = \begin{cases} t & t \geq 0 \\ 0 & t < 0 \end{cases}$$



Unit triangle

$$\Lambda(t) = \begin{cases} t+1 & -1 \leq t < 0 \\ -t+1 & 0 \leq t < 1 \\ 0 & \text{other} \end{cases}$$



$$\Lambda(t) = r(t+1) - 2r(t) + r(t-1)$$

