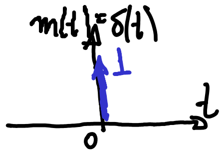
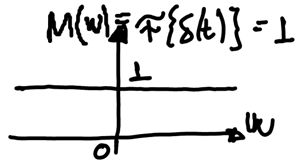
Ex (Dualidade)

$\delta(t) \rightleftharpoons 1$



$\rightleftharpoons$

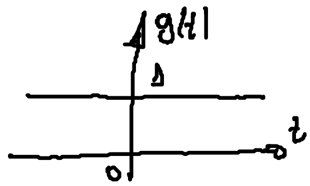


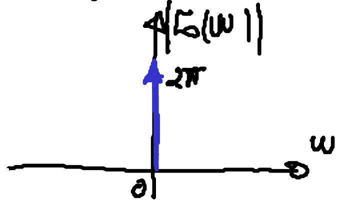
Calcular $\mathcal{F}\{g(t) = 1\}$

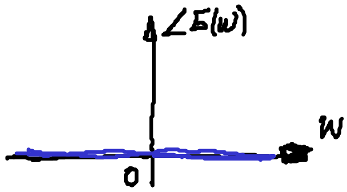
$$\boxed{G(w) = \int_{-\infty}^{\infty} g(t)\, e^{-jwt}\, dt}$$

$$M(t) \rightleftharpoons 2\pi m(-w)$$

$$\mathcal{F}\{1\} = 2\pi\, \delta(-w) = 2\pi\, \delta(w) \Rightarrow 1 \rightleftharpoons 2\pi\, \delta(w)$$







$z = a + j\overset{0}{b}$

$tg^{-1}\left(\frac{b}{a}\right) = tg^{-1}(0)$

Ex Calcular $\mathcal{F}\{g(t) = 2\}$

$$G(w) = 2 \cdot \mathcal{F}\{1\} = 2 \cdot 2\pi\, \delta(w) = 4\pi\, \delta(w)$$

Ex. (Desl. em frequência) Calcular a TF. de $g(t) = e^{jw_0 t}$

$$x(t) \cdot e^{jw_0 t} \rightleftharpoons X(w - w_0)$$

$$g(t) = x(t) \cdot e^{jw_0 t} \Rightarrow x(t) = 1 \rightleftharpoons 2\pi\delta(w)$$

$$G(w) = 2\pi\, \delta(w - w_0)$$

Ex Calcular a TF de $g(t) = e^{-jw_0 t}$

$$G(w) = 2\pi\, \delta(w + w_0)$$

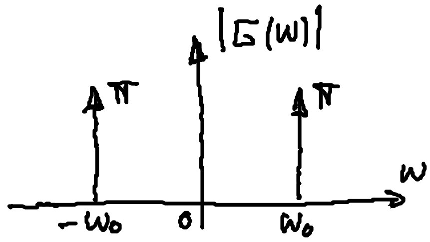
Ex. Calcular a T.F. de $g(t) = \cos(w_0 t)$

Lembremos que $\cos(w_0 t) = \dfrac{e^{jw_0 t} + e^{-jw_0 t}}{2} = \frac{1}{2} e^{jw_0 t} + \frac{1}{2} e^{-jw_0 t}$

$$\alpha g_1(t) + \beta g_2(t) \rightleftharpoons \alpha G_1(w) + \beta G_2(w)$$

$$G(w) = \frac{1}{2} 2\pi \delta(w - w_0) + \frac{1}{2} 2\pi \delta(w + w_0)$$

$$G(w) = \pi\left[\delta(w - w_0) + \delta(w + w_0)\right]$$



Ex. Calcular a T.F. de $g(t) = x(t)\cos(w_0 t)$, $\quad x(t) \rightleftharpoons X(w)$

$$g_1(t) \cdot g_2(t) \rightleftharpoons \frac{1}{2\pi} G_1(w) * G_2(w)$$

$$\boxed{g(t) * \delta(t - t_0) = \\ = g(t - t_0)}$$

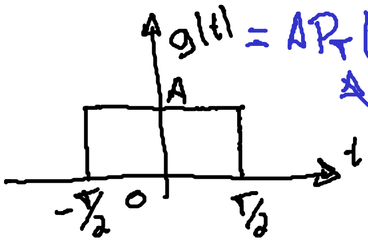
$$G(w) = \frac{1}{2\pi}\left[X(w) * \pi\left[\delta(w - w_0) + \delta(w + w_0)\right]\right]$$

$$= \frac{\pi}{2\pi}\left[X(w - w_0) + X(w + w_0)\right]$$

$$G(w) = \frac{1}{2}\left[X(w - w_0) + X(w + w_0)\right] \quad //$$

Ex. Calcular a T.F. de g(t) = A rect(t/T)

$g(t) = A P_T(t)$ Função Porta



$$G(w) = \int_{-T/2}^{T/2} A \cdot e^{-jwt}\, dt$$

$$= \frac{A}{jw}\left[e^{jwT/2} - e^{-jwT/2}\right]$$

Função Sampling

$$G(w) = AT\, S_a(wT/2)$$