

Apéndice A: Tabla de transformada de Fourier

$$f(t) \Leftrightarrow F(\omega) \quad (\text{a1})$$

$$a_1 f_1(t) + a_2 f_2(t) \Leftrightarrow a_1 F_1(\omega) + a_2 F_2(\omega) \quad (\text{a2})$$

$$f(at) \Leftrightarrow \frac{1}{|a|} F\left(\frac{\omega}{a}\right) \quad (\text{a3})$$

$$f(-t) \Leftrightarrow F(-\omega) \quad (\text{a4})$$

$$f(t - t_0) \Leftrightarrow F(\omega) e^{-i\omega t_0} \quad (\text{a5})$$

$$f(t) e^{i\omega_0 t} \Leftrightarrow F(\omega - \omega_0) \quad (\text{a6})$$

$$f(t) \cos(\omega_0 t) \Leftrightarrow \frac{1}{2} F(\omega - \omega_0) + \frac{1}{2} F(\omega + \omega_0) \quad (\text{a7})$$

$$f(t) \sin(\omega_0 t) \Leftrightarrow \frac{1}{2i} F(\omega - \omega_0) - \frac{1}{2i} F(\omega + \omega_0) \quad (\text{a8})$$

$$F(t) \Leftrightarrow 2\pi f(-\omega) \quad (\text{a9})$$

$$f^{(n)}(t) \Leftrightarrow (i\omega)^n F(\omega) \quad (\text{a10})$$

$$\int_{-\infty}^t f(x) dx \Leftrightarrow \frac{1}{i\omega} F(\omega) + \pi F(0) \delta(\omega) \quad (\text{a11})$$

$$(-it)^n f(t) \Leftrightarrow F^{(n)}(\omega) \quad (\text{a12})$$

$$f_1(t) * f_2(t) \Leftrightarrow F_1(\omega) F_2(\omega) \quad (\text{a13})$$

$$f_1(t) f_2(t) \Leftrightarrow \frac{1}{2\pi} F_1(\omega) * F_2(\omega) \quad (\text{a14})$$

$$e^{-at} H(t) \Leftrightarrow \frac{1}{i\omega + a} \quad (\text{a15})$$

$$e^{-a|t|} \Leftrightarrow \frac{2a}{a^2 + \omega^2} \quad (\text{a16})$$

$$e^{-at^2} \Leftrightarrow \sqrt{\frac{\pi}{a}} e^{-\frac{\omega^2}{4a}} \quad (\text{a17})$$

$$p_a(t) = \begin{cases} 1 & |t| < \frac{a}{2} \\ 0 & |t| > \frac{a}{2} \end{cases} \Leftrightarrow a \frac{\sin\left(\frac{\omega a}{2}\right)}{\left(\frac{\omega a}{2}\right)} \quad (\text{a18})$$

$$\frac{\sin(at)}{\pi t} \Leftrightarrow p_{2a}(\omega) \quad (\text{a19})$$

$$te^{-at} H(t) \Leftrightarrow \frac{1}{(i\omega + a)^2} \quad (\text{a20})$$

$$\frac{t^{n-1}}{(n-1)!} e^{-at} H(t) \Leftrightarrow \frac{1}{(i\omega + a)^n} \quad (\text{a21})$$

$$e^{-at} \sin(bt) H(t) \Leftrightarrow \frac{b}{(i\omega + a)^2 + b^2} \quad (\text{a22})$$

$$e^{-at} \cos(bt) H(t) \Leftrightarrow \frac{i\omega + a}{(i\omega + a)^2 + b^2} \quad (\text{a23})$$

$$\frac{1}{a^2 + t^2} \Leftrightarrow \frac{\pi}{a} e^{-a|\omega|} \quad (\text{a24})$$

$$\frac{\cos(bt)}{a^2 + t^2} \Leftrightarrow \frac{\pi}{2a} \left[e^{-a|\omega-b|} + e^{-a|\omega+b|} \right] \quad (\text{a25})$$

$$\frac{\sin(bt)}{a^2 + t^2} \Leftrightarrow \frac{\pi}{2ai} \left[e^{-a|\omega-b|} - e^{-a|\omega+b|} \right] \quad (\text{a26})$$

$$\delta(t) \Leftrightarrow 1 \quad (\text{a27})$$

$$\delta(t - t_0) \Leftrightarrow e^{-i\omega t_0} \quad (\text{a28})$$

$$\delta^{(n)}(t) \Leftrightarrow (i\omega)^n \quad (\text{a29})$$

$$H(t) \Leftrightarrow \pi \delta(\omega) + \frac{1}{i\omega} \quad (\text{a30})$$

$$H(t - t_0) \Leftrightarrow \pi \delta(\omega) + \frac{1}{i\omega} e^{-i\omega t_0} \quad (\text{a31})$$

$$1 \Leftrightarrow 2\pi \delta(\omega) \quad (\text{a32})$$

$$t^n \Leftrightarrow 2\pi i^n \delta^{(n)}(\omega) \quad (\text{a33})$$

$$e^{i\omega_0 t} \Leftrightarrow 2\pi \delta(\omega - \omega_0) \quad (\text{a34})$$

$$\cos(\omega_0 t) \Leftrightarrow \pi [\delta(\omega - \omega_0) + \delta(\omega + \omega_0)] \quad (\text{a35})$$

$$\sin(\omega_0 t) \Leftrightarrow -i\pi [\delta(\omega - \omega_0) - \delta(\omega + \omega_0)] \quad (\text{a36})$$

$$\begin{aligned} & H(t) \sin(\omega_0 t) \quad (\text{a37}) \\ \Leftrightarrow & \frac{\omega_0}{\omega_0^2 - \omega^2} + \frac{\pi}{2i} [\delta(\omega - \omega_0) - \delta(\omega + \omega_0)] \end{aligned}$$

$$\begin{aligned} & H(t) \cos(\omega_0 t) \quad (\text{a38}) \\ \Leftrightarrow & \frac{i\omega_0}{\omega_0^2 - \omega^2} + \frac{\pi}{2i} [\delta(\omega - \omega_0) + \delta(\omega + \omega_0)] \end{aligned}$$

$$tH(t) \Leftrightarrow i\pi\delta'(\omega) - \frac{1}{\omega^2} \quad (\text{a39})$$

$$\frac{1}{t^n} \Leftrightarrow \frac{(-i\omega)^{n-1}}{(n-1)!} [\pi i - 2\pi i H(\omega)] \quad (\text{a40})$$

$$\int_{-\infty}^{\infty} f_1(t) f_2(t) dt = \frac{1}{2\pi} \int_{-\infty}^{\infty} F_1(\omega) F_2^*(\omega) d\omega \quad (\text{a41})$$

$$\int_{-\infty}^{\infty} |f(t)|^2 dt = \frac{1}{2\pi} \int_{-\infty}^{\infty} |F(\omega)|^2 d\omega \quad (\text{a42})$$

$$\int_{-\infty}^{\infty} f(t) G(t) dt = \int_{-\infty}^{\infty} F(\omega) g(\omega) d\omega \quad (\text{a43})$$

$$te^{-a^2 t^2} \Leftrightarrow \frac{\omega\sqrt{\pi}}{4a^3} e^{-\omega^2/4a^2} : (a > 0) \quad (\text{S7})$$

$$\frac{e^{-at}}{t} \Leftrightarrow \tan^{-1}\left(\frac{\omega}{a}\right) : (a > 0) \quad (\text{S8})$$

$$\frac{t}{a^2 + t^2} \Leftrightarrow \frac{\pi}{2} e^{-a\omega} : (a > 0) \quad (\text{S9})$$

$$\frac{t}{(a^2 + t^2)^2} \Leftrightarrow 2^{-3/2} \frac{\omega e^{-a\omega}}{a} : (a > 0) \quad (\text{S10})$$

$$\frac{1}{t(a^2 + t^2)} \Leftrightarrow \frac{\pi}{2} \frac{(1 - e^{-a\omega})}{a^2} : (a > 0) \quad (\text{S11})$$

$$e^{-t/\sqrt{2}} \sin\left(\frac{t}{\sqrt{2}}\right) \Leftrightarrow \frac{\omega}{1 + \omega^4} \quad (\text{S12})$$

$$\frac{2}{\pi} \tan^{-1}\left(\frac{a}{t}\right) \Leftrightarrow \frac{1 - e^{-a\omega}}{\omega} : (a > 0) \quad (\text{S13})$$

$$\frac{4}{\pi} \frac{t}{4 + t^4} \Leftrightarrow e^{-\omega} \sin \omega \quad (\text{S14})$$

Apéndice C: Tabla de transformada coseno de Fourier

$$f(t) \Leftrightarrow F_C(\omega) \quad (\text{C1})$$

$$t^{r-1} \Leftrightarrow \Gamma(r) \omega^{-r} \cos\left(\frac{\pi r}{2}\right) : r \in (0, 1) \quad (\text{C2})$$

$$e^{-at} \Leftrightarrow \frac{a}{a^2 + \omega^2} : (a > 0) \quad (\text{C3})$$

$$te^{-at} \Leftrightarrow \frac{a^2 - \omega^2}{(a^2 + \omega^2)^2} : (a > 0) \quad (\text{C4})$$

$$e^{-a^2 t^2} \Leftrightarrow \frac{\omega\sqrt{\pi}}{2a} e^{-\omega^2/4a^2} : (a > 0) \quad (\text{C5})$$

$$\frac{1}{a^2 + t^2} \Leftrightarrow \frac{\pi}{2a} e^{-a\omega} : (a > 0) \quad (\text{C6})$$

$$\frac{1}{(a^2 + t^2)^2} \Leftrightarrow \frac{\pi}{4} \frac{e^{-a\omega} (1 + a\omega)}{a^3} : (a > 0) \quad (\text{C7})$$

Apéndice B: Tabla de transformada seno de Fourier

$$f(t) \Leftrightarrow F_S(\omega) \quad (\text{S1})$$

$$\frac{1}{t} \Leftrightarrow \pi H(\omega) - \frac{\pi}{2} \quad (\text{S2})$$

$$t^{r-1} \Leftrightarrow \Gamma(r) \omega^{-r} \sin\left(\frac{\pi r}{2}\right) : r \in (0, 1) \quad (\text{S3})$$

$$\frac{1}{\sqrt{t}} \Leftrightarrow \sqrt{\frac{\pi}{2\omega}} \quad (\text{S4})$$

$$e^{-at} \Leftrightarrow \frac{\omega}{a^2 + \omega^2} : (a > 0) \quad (\text{S5})$$

$$te^{-at} \Leftrightarrow \frac{2a\omega}{(a^2 + \omega^2)^2} : (a > 0) \quad (\text{S6})$$

$$\cos\left(\frac{x^2}{2}\right) \Leftrightarrow \frac{\sqrt{\pi}}{2} \left(\cos\left(\frac{\omega^2}{2}\right) + \sin\left(\frac{\omega^2}{2}\right) \right) \quad (C8)$$

$$\sin\left(\frac{x^2}{2}\right) \Leftrightarrow \frac{\sqrt{\pi}}{2} \left(\cos\left(\frac{\omega^2}{2}\right) - \sin\left(\frac{\omega^2}{2}\right) \right) \quad (C8)$$

Apéndice D: Referencias Bibliográficas

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