

Table of Fourier Transforms

This table will appear on the final exam.

| $f(t)$ | $F(\omega) = F[f(t)]$ | |
|---|---|---------------------------------|
| $f(t)$ | $\frac{1}{2\pi} \int_{-\infty}^{\infty} f(t) e^{-i\omega t} dt$ | Definition of Fourier transform |
| $\int_{-\infty}^{\infty} F(\omega) e^{i\omega t} d\omega$ | $F(\omega)$ | The Fourier relations |
| $u_0(t)f(t)$ | $\frac{1}{2\pi} \mathcal{L}[f(t)]$ with $s = i\omega$ | Relation to Laplace transform |
| $cf(t) + g(t)$ | $cF[f(t)] + F[g(t)]$ | Linearity |
| $f(at)$ | $\frac{1}{a} F\left(\frac{\omega}{a}\right)$ | Scaling |
| $f(t - a)$ | $e^{-ia\omega} F(\omega)$ | Shifting 1 |
| $e^{iat}f(t)$ | $F[f(t - a)]$ | Shifting 2 |
| $f'(t)$ | $i\omega F(\omega)$ | First derivative in t |
| $f''(t)$ | $-\omega^2 F(\omega)$ | Second derivative in t |
| $itf(t)$ | $F'(\omega)$ | First derivative in ω |