**Table of Important Fourier Transforms for Signals and Systems**

|  |  |
| --- | --- |
| $$f\left(t\right)=$$ | $$F\left(jω\right)= $$ |
| $$e^{jω\_{0}t}$$ | $$2πδ(ω-ω\_{0})$$ |
| $$1$$ | $$2πδ(ω)$$ |
| $$\sum\_{n=-\infty }^{+\infty }δ(t-nT)$$ | $$\frac{2π}{T}\sum\_{-\infty }^{+\infty }δ(ω-\frac{2πk}{T})$$ |
| $$\left\{\begin{array}{c}1, \left|t\right|<T\_{1}\\0, \left|t\right|>T\_{1}\end{array}\right.$$ | $$\frac{2sin⁡(ωT\_{1})}{ω}$$ |
| $$\frac{sin⁡(Wt)}{πt}$$ | $$\left\{\begin{array}{c}1, \left|ω\right|<W\\0, \left|ω\right|>W\end{array}\right.$$ |
| $$δ(t)$$ | $$1$$ |
| $$u(t)$$ | $$\frac{1}{jω}+πδ(ω)$$ |
| $$e^{-at}u\left(t\right), Re\left\{a\right\}>0$$ | $$\frac{1}{a+jω}$$ |
| $$te^{-at}u\left(t\right), Re\left\{a\right\}>0$$ | $$\frac{1}{(a+jω)^{2}}$$ |
| $$rect(\frac{t}{τ})$$ | $$τsinc(\frac{ωτ}{2})$$ |
| $$\frac{B}{2π}sinc(\frac{Bt}{2})$$ | $$rect(\frac{ω}{B})$$ |
| $$triangle\left(t\right)$$ | $$sinc^{2}(\frac{ω}{2})$$ |
| $$Acos\left(\frac{πt}{2τ}\right)rect(\frac{t}{2τ})$$ | $$\frac{Aπ}{τ}\frac{cos⁡(ωτ)}{((^{π}/\_{2τ})^{2}-ω^{2})}$$ |
| $$\sin(\left(ω\_{0}t\right))$$ | $$\frac{π}{j}[δ\left(ω-ω\_{0}\right)-δ\left(ω+ω\_{0}\right)]$$ |
| $$\cos(\left(ω\_{0}t\right))$$ | $$π[δ\left(ω-ω\_{0}\right)-δ\left(ω+ω\_{0}\right)]$$ |
| $$\sin(\left(ω\_{0}t\right))u(t)$$ | $$\frac{π}{2j}\left[δ\left(ω-ω\_{0}\right)-δ\left(ω+ω\_{0}\right)\right]+\frac{jω}{ω\_{0}^{2}-ω^{2}}$$ |
| $$\cos(\left(ω\_{0}t\right))u(t)$$ | $$\frac{π}{2}[δ\left(ω-ω\_{0}\right)-δ\left(ω+ω\_{0}\right)] +\frac{ω^{2}}{ω\_{0}^{2}-ω^{2}}$$ |
| $$e^{-αt}\sin(\left(ω\_{0}t\right))u(t)$$ | $$\frac{(α+jω)}{ω\_{0}^{2}+(α+jω)^{2}}$$ |
| $$e^{-αt}\cos(\left(ω\_{0}t\right))u(t)$$ | $$\frac{ω\_{0}}{ω\_{0}^{2}+(α+jω)^{2}}$$ |
| $$e^{-α\left|t\right|}$$ | $$\frac{2α}{α^{2}+ω^{2}}$$ |
| $$e^{^{-t^{2}}/\_{2σ^{2}}}$$ | $$σ\sqrt{2π}e^{-σ^{2}ω^{2}/2}$$ |