Transform Tables

- List of Integral / Space Transforms
- Fourier Analysis

Useful Equations

Eulers Formula	$$e^{jx} = \cos(x)+j\sin(x)$$
Eulers Cosine	$$\cos(x) = \frac{e^{jx}}{2} + \frac{e^{-jx}}{2}$$
Eulers Sine	$$\sin(x) = \frac{je^{-jx}}{2} - \frac{je^{jx}}{2}$$
Angular Frequency	$$\omega = 2\pi f$$
Period	$$T = \frac{1}{f}$$

Common Integrals

$$\int\,u\,dv = uv-\int\,v\,du$$
$$\int\,\frac{1}{ax+b}\,dx = \frac{1}{a}ln(ax+b)$$
$$\int\,\sin(x)\,dx = -\cos(x)$$
$$\int\,\cos(x)\,dx = \sin(x)$$
$$\int\,e^{ax}\,dx = \frac{1}{a}e^{ax}$$
$$\int\,xe^x\,dx = (x-1)e^x$$

Common Derivatives

$$\frac{d}{dx}(f(x)g(x)) = f(x)\dot{g}(x) + \dot{f}(x)g(x)$$
$$\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{f(x)\dot{g}(x)-\dot{f}(x)g(x)}{(g(x))^2}$$
$$\frac{d}{dx}(\sin(x)) = \cos(x) $$
$$\frac{d}{dx}(\cos(x)) = -\sin(x) $$
$$\frac{d}{dx}(\tan(x)) = \sec^2(x) $$
$$\frac{d}{dx}(\sin^{-1}(x)) = \frac{1}{\sqrt{1-x^2}}$$
$$\frac{d}{dx}(\cos^{-1}(x)) = \frac{-1}{\sqrt{1-x^2}}$$
$$\frac{d}{dx}(\tan^{-1}(x)) = \frac{1}{1+x^2}$$
$$\frac{d}{dx}(a^x) = a^x\ln(a)$$
$$\frac{d}{dx}(\ln\|x\|) = \frac{1}{x}$$
$$\frac{d}{dx}(\log_a(x)) = \frac{1}{x\ln(a)}$$

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