Integral Formulas

$$\int e^{ax}\sin(bx)\,dx = \frac{1}{a^2+b^2}e^{ax}\left(a\sin(bx) - b\cos(bx)\right) + C$$

$$\int e^{ax}\cos(bx)\,dx = \frac{1}{a^2+b^2}e^{ax}\left(a\cos(bx) + b\sin(bx)\right) + C$$

$$\int \sin(ax)\cos(bx)\,dx = \frac{b\sin(ax)\sin(bx) + a\cos(ax)\cos(bx)}{b^2-a^2} + C$$

$$\int \sin(ax)\sin(bx)\,dx = \frac{b\sin(ax)\cos(bx) - a\cos(ax)\sin(bx)}{a^2-b^2} + C$$

$$\int \cos(ax)\cos(bx)\,dx = \frac{a\sin(ax)\cos(bx) - b\cos(ax)\sin(bx)}{a^2-b^2} + C$$

$$\int xe^{ax}\,dx = \frac{1}{a^2}(ax-1)e^{ax} + C$$

$$\int x^2e^{ax}\,dx = \frac{1}{a^3}(a^2x^2 - 2ax + 2)e^{ax} + C$$

$$\int x^3e^{ax}\,dx = \frac{1}{a^4}(a^3x^3 - 3a^2x^2 + 6ax - 6)e^{ax} + C$$

Laplace Transformation Formulas

$$Ł\{y'\} = sŁ\{y\} - y(0)$$

$$Ł\{y''\} = s^2Ł\{y\} - sy(0) - y'(0)$$

$$Ł\{1\} = \frac{1}{s}$$

$$Ł\{t^n\} = \frac{n!}{s^{n+1}}$$

$$Ł\left\{e^{at}\right\} = \frac{1}{s-a}$$

$$Ł\{\sin(bt)\} = \frac{b}{s^2+b^2}$$

$$Ł\{\cos(bt)\} = \frac{s}{s^2+b^2}$$

$$Ł\{\delta(t-a)\} = e^{-as}$$

$$Ł\{u(t-a)\} = \frac{e^{-as}}{s}$$

$$Ł\{f(t-a)u(t-a)\} = Ł\{f\}e^{-as}$$

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