Integral Formulas

$$\int e^{ax}\sin(bx)\,dx = \frac{1}{a^2+b^2}e^{ax}\left(a\sin(bx) - b\cos(bx)\right) + C$$
$$\int e^{ax}\cos(bx)\,dx = \frac{1}{a^2+b^2}e^{ax}\left(a\cos(bx) + b\sin(bx)\right) + C$$
$$\int \sin(ax)\cos(bx)\,dx = \frac{b\sin(ax)\sin(bx) + a\cos(ax)\cos(bx)}{b^2-a^2} + C$$
$$\int \sin(ax)\sin(bx)\,dx = \frac{b\sin(ax)\cos(bx) - a\cos(ax)\sin(bx)}{a^2-b^2} + C$$
$$\int \cos(ax)\cos(bx)\,dx = \frac{a\sin(ax)\cos(bx) - b\cos(ax)\sin(bx)}{a^2-b^2} + C$$
$$\int xe^{ax}\,dx = \frac{1}{a^2}(ax-1)e^{x} + C$$
$$\int x^2e^{ax}\,dx = \frac{1}{a^3}(a^2x^2-2ax+2)e^{x} + C$$
$$\int x^3e^{ax}\,dx = \frac{1}{a^4}(a^3x^3-3a^2x^2+6ax-6)e^{x} + C$$

Laplace Transformation Formulas

$$Ł\left\{y'\right\} = sŁ\{y\} - y(0)$$
$$Ł\left\{y''\right\} = s^2Ł\{y\} - sy(0) - y'(0)$$
$$Ł\left\{1\right\} = \frac{1}{s}$$
$$Ł\left\{t^n\right\} = \frac{n!}{s^{n+1}}$$
$$Ł\left\{e^{at}\right\} = \frac{1}{s-a}$$
$$Ł\left\{\sin(bt)\right\} = \frac{b}{s^2+b^2}$$
$$Ł\left\{\cos(bt)\right\} = \frac{s}{s^2+b^2}$$
$$Ł\left\{\delta(t-a)\right\} = e^{-as}$$
$$Ł\left\{u(t-a)\right\} = \frac{e^{-as}}{s}$$
$$Ł\left\{f(t-a)u(t-a)\right\} = e^{-as}Ł\{f\}$$

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