Table of Laplace Transforms:

$$\mathcal{L}\left\{t\right\} = \frac{1}{s^2}$$

$$\mathcal{L}\left\{t^n\right\} = \frac{n!}{s^{n+1}}$$

$$\mathcal{L}\left\{t^{-1/2}\right\} = \frac{\sqrt{\pi}}{s^{1/2}}$$

 $\mathcal{L}\left\{\cos(kt)\right\} = \frac{s}{s^2 + h^2}$

 $\mathcal{L}\left\{\sinh(kt)\right\} = \frac{k}{\epsilon^2 - k^2}$

 $\mathcal{L}\left\{\cosh(kt)\right\} = \frac{s}{s^2 - k^2}$

 $\mathcal{L}\left\{1\right\} = \frac{1}{-}$

$$\mathcal{L}\left\{t^{-1/2}\right\} = \frac{\sqrt{\pi}}{s^{1/2}}$$

$$\mathcal{L}\left\{t^{1/2}\right\} = \frac{\sqrt{\pi}}{2s^{3/2}}$$

$$\mathcal{L}\left\{t^{\alpha}\right\} = \frac{\Gamma(\alpha+1)}{s^{\alpha+1}}$$

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

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$$\mathcal{L}\left\{\sin(kt)\right\} = \frac{k}{s^2+k^2}$$

 $\mathcal{L}\left\{f^{(n)}(t)\right\} = s^n F(s) - s^{n-1} f(0) - \dots - f^{(n-1)}(0)$

 $(f * g)(t) = \int_0^t f(\tau)g(t - \tau) d\tau$

 $\mathcal{L}\left\{f * g\right\} = F(s)G(s)$

$$\mathcal{L}\left\{t\cos(kt)\right\} = \frac{s^2 - k^2}{(s^2 + k^2)^2}$$

$$\mathcal{L}\left\{e^{at}f(t)\right\} = F(s - a)$$

$$\mathcal{L}\left\{\mathcal{U}(t - a)\right\} = \frac{e^{-as}}{s^2 - k^2}$$

$$\mathcal{L}\left\{e^{at}f(t)\right\} = F(s-a)$$

$$\mathcal{L}\left\{\mathcal{U}(t-a)\right\} = \frac{e^{-as}}{s}$$

$$= F(s - a)$$

$$= \frac{e^{-as}}{s}$$

$$= e^{-as}F(s)$$

 $\mathcal{L}\left\{f(t-a)\mathcal{U}(t-a)\right\} = e^{-as}F(s)$

$$\frac{e^{-as}}{s}$$

$$e^{-as}F(s)$$

$$\frac{e^{-as}}{s}$$
 $e^{-as}F(s)$

$$\mathcal{L}\left\{t\sin(kt)\right\} = \frac{2ks}{(s^2 + k^2)^2}$$

 $\mathcal{L}\left\{te^{at}\right\} = \frac{1}{(s-a)^2}$

 $\mathcal{L}\left\{t^n e^{at}\right\} = \frac{n!}{(s-a)^{n+1}}$

 $\mathcal{L}\left\{e^{at}\sin(kt)\right\} = \frac{k}{(s-a)^2 + k^2}$

 $\mathcal{L}\left\{e^{at}\cos(kt)\right\} = \frac{s-a}{(s-a)^2 + k^2}$

 $\mathcal{L}\left\{q(t)\mathcal{U}(t-a)\right\} = e^{-as}\mathcal{L}\left\{g(t+a)\right\}$

 $\mathcal{L}\left\{t^n f(t)\right\} = (-1)^n \frac{d^n}{ds^n} F(s)$