

LAPLACE DÖNÜŞÜM TABLOSU	
Fonksiyon $f(t)$	Laplace Dönüşümü $F(s) = \mathcal{L}\{f(t)\}$
1	$\frac{1}{s}$ ($s > 0$)
t	$\frac{1}{s^2}$ ($s > 0$)
t^k ($k \geq 0$)	$\frac{k!}{s^{k+1}}$ ($s > 0$)
$e^{\alpha.t}$	$\frac{1}{s - \alpha}$ ($s > \alpha$)
$e^{-\alpha.t}$	$\frac{1}{s + \alpha}$
$\text{Cos}(\alpha.t)$	$\frac{s}{s^2 + \alpha^2}$ ($s > 0$)
$\text{Sin}(\alpha.t)$	$\frac{\alpha}{s^2 + \alpha^2}$ ($s > 0$)
$\text{Cosh}(\alpha.t)$	$\frac{s}{s^2 - \alpha^2}$ ($s > \alpha $)
$\text{Sinh}(\alpha.t)$	$\frac{\alpha}{s^2 - \alpha^2}$ ($s > \alpha $)
t^k ($k > -1$)	$\frac{\Gamma(k+1)}{s^{k+1}}$ ($s > 0$)
$\frac{1}{\sqrt{t}}$	$\sqrt{\frac{\pi}{s}}$
$t.e^{-\alpha.t}$	$\frac{1}{(s + \alpha)^2}$
$t^k.e^{\alpha.t}$	$\frac{k!}{(s - \alpha)^{k+1}}$
$e^{-\alpha.t}.\text{Cos}(\beta.t)$	$\frac{s + \alpha}{(s + \alpha)^2 + \beta^2}$
$e^{-\alpha.t}.\text{Sin}(\beta.t)$	$\frac{\beta}{(s + \alpha)^2 + \beta^2}$
$e^{\alpha.t}.\text{Cos}(\beta.t)$	$\frac{s - \alpha}{(s - \alpha)^2 + \beta^2}$
$e^{\alpha.t}.\text{Sin}(\beta.t)$	$\frac{\beta}{(s - \alpha)^2 + \beta^2}$
$\frac{e^{\alpha.t}.\text{Sinh}(\beta.t)}{\beta}$	$\frac{1}{(s - \alpha)^2 - \beta^2}$
$e^{\alpha.t}.\text{Cosh}(\beta.t)$	$\frac{s - \alpha}{(s - \alpha)^2 - \beta^2}$

$t.Cos(\beta.t)$	$\frac{s^2 - \beta^2}{(s^2 + \beta^2)^2}$
$\frac{t.Sin(\beta.t)}{2\beta}$	$\frac{s}{(s^2 + \beta^2)^2}$
$t.Cosh(\beta.t)$	$\frac{s^2 + \beta^2}{(s^2 - \beta^2)^2}$
$\frac{t.Sinh(\beta.t)}{2\beta}$	$\frac{s}{(s^2 - \beta^2)^2}$
$Cos(\beta.t).Cosh(\beta.t)$	$\frac{s^3}{s^4 + 4\beta^4}$
$\frac{Sin(\beta.t).Sinh(\beta.t)}{2\beta^2}$	$\frac{s}{s^4 + 4\beta^4}$
$\frac{Sin(\beta.t) - \beta.t.Cos(\beta.t)}{2\beta^3}$	$\frac{1}{(s^2 + \beta^2)^2}$
$\frac{t}{2\alpha} Sin(\alpha.t)$	$\frac{s}{(s^2 + \alpha^2)^2}$
$\frac{1}{2\alpha} (Sin(\alpha.t) + \alpha.t.Cos(\alpha.t))$	$\frac{s^2}{(s^2 + \alpha^2)^2}$
$\frac{1}{2\alpha^3} (Sin(\alpha.t) - \alpha.t.Cos(\alpha.t))$	$\frac{1}{(s^2 + \alpha^2)^2}$

TERS LAPLACE DÖNÜŞÜM TABLOSU	
Fonksiyon $F(s)$	Ters Laplace Dönüşümü $f(t) = \mathcal{L}^{-1}\{F(s)\}$
$\frac{1}{s}$	1
$\frac{n!}{s^{n+1}}$	t^n
$\frac{1}{s - \alpha}$	$e^{\alpha.t}$
$\frac{1}{s + \alpha}$	$e^{-\alpha.t}$
$\frac{1}{(s - \alpha)^n}$	$\frac{t^{n-1} \cdot e^{\alpha.t}}{(n-1)!}$
$\frac{s}{s^2 + \alpha^2}$	$\text{Cos}(\alpha.t)$
$\frac{\alpha}{s^2 + \alpha^2}$	$\text{Sin}(\alpha.t)$
$\frac{s}{s^2 - \alpha^2}$	$\text{Cosh}(\alpha.t)$
$\frac{\alpha}{s^2 - \alpha^2}$	$\text{Sinh}(\alpha.t)$
$\frac{1}{\sqrt{s}}$	$\frac{1}{\sqrt{\pi t}}$
$\frac{1}{s\sqrt{s}}$	$2\sqrt{\frac{t}{\pi}}$
$\frac{1}{(s - \alpha)(s - \beta)}$	$\frac{e^{\alpha.t} - e^{\beta.t}}{\alpha - \beta}$
$\frac{1}{(s - \alpha)(s - \beta)(s - \chi)}$	$\frac{(\beta - \chi)e^{\alpha.t} + (\chi - \alpha)e^{\beta.t} + (\alpha - \beta)e^{\chi.t}}{(\alpha - \beta)(\beta - \chi)(\chi - \alpha)}$

Özellik	Laplace dönüşümü	Ters Laplace dönüşümü
	$F(s) = \mathcal{L}\{f(t)\} \quad , \quad f(t) = \mathcal{L}^{-1}\{F(s)\}$	
Doğrusallık	$\mathcal{L}[\alpha_1 \cdot f_1(t) + \alpha_2 \cdot f_2(t)] = \alpha_1 \cdot F_1(s) + \alpha_2 \cdot F_2(s)$	$\mathcal{L}^{-1}\{\alpha_1 \cdot F_1(s) + \alpha_2 \cdot F_2(s)\} = \alpha_1 \cdot f_1(t) + \alpha_2 \cdot f_2(t)$
Zamanda öteleme	$f(t) = \begin{cases} f_1(t - \alpha) & , \quad t > \alpha \\ 0 & , \quad t < \alpha \end{cases}$ $\mathcal{L}[f(t)] = e^{-\alpha \cdot s} \cdot F_1(s)$	$\mathcal{L}^{-1}\{e^{-\alpha \cdot s} F(s)\} = \begin{cases} f(t - \alpha) & , \quad t > \alpha \\ 0 & , \quad t < \alpha \end{cases}$
s-domeninde öteleme	$\mathcal{L}[e^{\alpha \cdot t} \cdot f_1(t)] = F_1(s - \alpha)$	$\mathcal{L}^{-1}\{F(s - \alpha)\} = e^{\alpha \cdot t} \cdot f(t)$
Ölçekleme	$\mathcal{L}[f(\alpha \cdot t)] = \frac{1}{\alpha} F\left(\frac{s}{\alpha}\right)$	$\mathcal{L}^{-1}\{F(\alpha \cdot s)\} = \frac{1}{\alpha} \cdot f\left(\frac{t}{\alpha}\right)$
t/s ile bölme	$\mathcal{L}\left[\frac{f(t)}{t}\right] = \int_s^{\infty} F(p) \cdot dp$	$\mathcal{L}^{-1}\left\{\frac{F(s)}{s}\right\} = \int_0^t f(v) \cdot dv$
t ^k /s ile çarpma	$\mathcal{L}[t^k \cdot f(t)] = (-1)^k \frac{d^k}{ds^k} F(s)$	$\mathcal{L}^{-1}\{s \cdot F(s)\} = f'(t)$
Türev	$\mathcal{L}\{f^{(k)}(t)\} = s^k \cdot F(s) - s^{k-1} \cdot f(0) - s^{k-2} \cdot f'(0) - \dots$	$\mathcal{L}^{-1}\{F^{(k)}(s)\} = (-1)^k \cdot t^k \cdot f(t)$
İntegral	$\mathcal{L}\left\{\int_0^t f(p) \cdot dp\right\} = \frac{F(s)}{s}$	$\mathcal{L}^{-1}\left\{\int_s^{\infty} F(v) \cdot dv\right\} = \frac{f(t)}{t}$
Konvolüsyon	$\mathcal{L}\{f_1(t) * f_2(t)\} = F_1(s) \cdot F_2(s)$	$\mathcal{L}^{-1}\{F_1(s) * F_2(s)\} = \int_0^t f_1(v) \cdot f_2(t - v) \cdot dv$