

FONKSİYON ADI	ZAMAN FONKSİYONU f(t)	LAPLACE DÖNÜŞÜMÜ f(s)
Birim Ani Darbe	$\delta(t)$	1
Birim Basamak (Step)	$A.u(t)$	$\frac{A}{s}$
Birim Rampa (Ramp)	$A.t$	$\frac{A}{s^2}$
Üstel (Exponential)	e^{-at}	$\frac{1}{s+a}$
Tekrarlı Kök	te^{-at}	$\frac{1}{(s+a)^2}$
Tekrarlı Kök	$t^n e^{-at} \ (n = 1,2,3, \dots)$	$\frac{n!}{(s+a)^{n+1}}$
Polinom (Polynomial)	$t^n \ (n = 1,2,3, \dots)$	$\frac{n!}{s^{n+1}}$
Sinüs (Sinusoidal)	$\sin(\omega t)$	$\frac{\omega}{s^2 + \omega^2}$
Sönümlü Sinüs (Damped sine)	$e^{-at} \sin(\omega t)$	$\frac{\omega}{(s+a)^2 + \omega^2}$
Cosinüs (Cosinusoidal)	$\cos(\omega t)$	$\frac{s}{s^2 + \omega^2}$
Sönümlü Cosinüs (Damped cos)	$e^{-at} \cos(\omega t)$	$\frac{s+a}{(s+a)^2 + \omega^2}$

Laplace Transformunun Özellikleri ve Önemli Teoremler

1. Türev

$$\mathcal{L}\left[\frac{df(t)}{dt}\right] = sF(s) - f(0^-)$$

$$\mathcal{L}\left[\frac{d^nf(t)}{dt^n}\right] = s^nF(s) - s^{n-1}f(0^-) - s^{n-2}f^{(1)}(0^-) \dots - f^{(n-1)}(0^-)$$

Burada $f^{(n)}(0^-) = \left.\frac{d^nf(t)}{dt^n}\right|_{t=0^-}$

2. İntegrasyon

$$\mathcal{L}\left[\int_0^t f(\tau)d\tau\right] = \frac{F(s)}{s}$$

$$\mathcal{L}\left[\int_0^{t_n} \int_0^{t_{n-1}} \dots \int_0^{t_2} \int_0^{t_1} f(\tau)d\tau dt_1 \dots dt_{n-1}\right] = \frac{F(s)}{s^n}$$