Algumas Transformadas de Laplace

N	função	$\mathcal{L}[f]$	N	função	$\mathcal{L}[f]$	Condição
01	$u(t) \equiv 1$	$1/s$	02	t	$1/s^2$	$s > 0$
03	t^2	$2/s^3$	04	t^n	$n!/s^{n+1}$	$s > 0$
05	$e^{at}, a \in \mathbb{R}$	$\frac{1}{s-a}$	06	$e^{at}, a \in \mathbb{C}$	$\frac{1}{z-a}$	$\mathrm{Re}(z-a) > 0$
07	$\cos(at)$	$\frac{s}{s^2+a^2}$	08	$\sin(at)$	$\frac{a}{s^2+a^2}$	$s > 0$
09	$e^{at}\cos(bt)$	$\frac{s-a}{(s-a)^2+b^2}$	10	$e^{at}\sin(bt)$	$\frac{b}{(s-a)^2+b^2}$	$s > a$
11	$\cosh(at)$	$\frac{s}{s^2-a^2}$	12	$\sinh(at)$	$\frac{a}{s^2-a^2}$	$s > a$
13	$t\cos(at)$	$\frac{s^2-a^2}{(s^2+a^2)^2}$	14	$t\sin(at)$	$\frac{2as}{(s^2+a^2)^2}$	$s > 0$

Propriedades das Transformadas de Laplace

Tn	Propriedades da Transformada	In	Propriedades da Inversa
$T1$	$\mathcal{L}[f+g] = \mathcal{L}[f] + \mathcal{L}[g]$	$I1$	$\mathcal{L}^{-1}[F+G] = \mathcal{L}^{-1}[F] + \mathcal{L}^{-1}[G]$
$T2$	$\mathcal{L}[kf] = k\mathcal{L}[f]$	$I2$	$\mathcal{L}^{-1}[kF] = k\mathcal{L}^{-1}[F]$
$T3$	$\mathcal{L}[e^{-at}f(t)] = F(s+a)$	$I3$	$\mathcal{L}^{-1}[F(s+a)] = e^{-at}f(t)$
$T4$	$\mathcal{L}[f * g] = F(s).G(s)$	$I4$	$\mathcal{L}^{-1}[F(s).G(s)] = f * g$
$T5$	$\mathcal{L}[(-t)f(t)] = F'(s)$	$I5$	$\mathcal{L}^{-1}[F'(s)] = (-t)f(t)$
$T6$	$\mathcal{L}[(-t)^n\ f(t)] = F^{(n)}(s)$	$I6$	$\mathcal{L}^{-1}[F^{(n)}(s)] = (-t)^n\ f(t)$
$T7$	$\mathcal{L}\left[\int_0^t f(w)dw\right] = \frac{F(s)}{s}$	$I7$	$\mathcal{L}^{-1}\left[\frac{F(s)}{s}\right] = \int_0^t f(w)dw$

Tabela: Transformada de Laplace

1	$\frac{1}{s}$
e^{at}	$\frac{1}{s-a}$
t^n	$\frac{n!}{s^{n+1}}$
$\operatorname{sen} at$	$\frac{a}{s^2+a^2}$
$\cos at$	$\frac{s}{s^2+a^2}$
$\operatorname{senh}\ at$	$\frac{a}{s^2-a^2}$
$\cosh\ at$	$\frac{s}{s^2-a^2}$
$e^{at}\operatorname{sen} bt$	$\frac{b}{(s-a)^2+b^2}$
$e^{at}\cos bt$	$\frac{s-a}{(s-a)^2+b^2}$
$t^n e^{at}$	$\frac{n!}{(s-a)^{n+1}}$
$U_c(t)$	$\frac{e^{-cs}}{s}$
$U_c(t)f(t-c)$	$e^{-cs}F(s)$
$e^{ct}f(t)$	$F(s-c)$
$f(ct)$	$\frac{1}{c}F\left(\frac{s}{c}\right)$
$\int_0^t f(t-\tau)g(\tau)d\tau$	$F(s)G(s)$
$\delta(t-c)$	e^{-cs}
$f^{(n)}(t)$	$s^nF(s)-s^{(n-1)}f(0)-\ldots-f^{(n-1)}(0)$
$(-t)^nf(t)$	$F^{(n)}(s)$