f(t)	F(s)
$\delta(t)$	1
u(t)	$\frac{1}{s}$
tu(t)	$\frac{1}{s^2}$
$t^n u(t)$	$\frac{n!}{s^{n+1}}$
$e^{-at}u(t)$	$\frac{1}{s+a}$
$\sin \omega t u(t)$	$\frac{\omega}{s^2+\omega^2}$
$\cos \omega t u(t)$	$\frac{s}{s^2 + \omega^2}$
	$\delta(t)$ $u(t)$ $tu(t)$ $t^{n}u(t)$ $e^{-at}u(t)$ $\sin \omega t u(t)$

Table 2.1 Laplace transform table

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ltem no.	Theorem		Name
1.	$\mathcal{L}[f(t)] = F(s)$	$= \int_{0-}^{\infty} f(t)e^{-st}dt$	Definition
2.	$\mathcal{L}[kf(t)]$	= kF(s)	Linearity theorem
3.	$\mathcal{L}[f_1(t) + f_2(t)]$	$= F_1(s) + F_2(s)$	Linearity theorem
4.	$\mathcal{L}[e^{-at}f(t)]$	= F(s+a)	Frequency shift theorem
5.	$\mathcal{L}[f(t-T)]$	$= e^{-sT}F(s)$	Time shift theorem
6.	$\mathcal{L}[f(at)]$	$=\frac{1}{a}F\left(\frac{s}{a}\right)$	Scaling theorem
7.	$\mathcal{L}\left[\frac{df}{dt}\right]$	= sF(s) - f(0-)	Differentiation theorem
8.	$\mathcal{L}\left[\frac{d^2f}{dt^2}\right]$	$= s^2 F(s) - sf(0-) - \dot{f}(0-)$	Differentiation theorem
9.	$\mathcal{L}\left[\frac{d^n f}{dt^n}\right]$	$= s^{n}F(s) - \sum_{k=1}^{n} s^{n-k} f^{k-1}(0-)$	Differentiation theorem
10.	$\mathscr{L}\left[\int_{0-}^{t} f(\tau) d\tau\right]$	$=\frac{F(s)}{s}$	Integration theorem
11.	$f(\infty)$	$=\lim_{s\to 0} sF(s)$	Final value theorem ¹
12.	f(0+)	$= \lim_{s \to \infty} sF(s)$	Initial value theorem ²

Table 2.2 12. $f(0+) = \lim_{s \to \infty} sF(s)$ Initial value theorem² Laplace 15. $f(0+) = \lim_{s \to \infty} sF(s)$ Initial value theorem² 16. For this theorem to yield correct finite results, all roots of the denominator of F(s) must have negative real parts and no more than one can be at the origin. 17. For this theorem to be valid, f(t) must be continuous or have a step discontinuity at t=0 (i.e., no impulses or their derivatives at t=0). 18. The second state of the denominator of F(s) must have negative real parts and no more than one can be at the origin. 19. The second state of the denominator of F(s) must have negative real parts and no more than one can be at the origin. 19. The second state of the denominator of F(s) must have negative real parts and no more than one can be at the origin. 20. The second state of the denominator of F(s) must have negative real parts and no more than one can be at the origin. 21. The second state of the denominator of F(s) must have negative real parts and no more than one can be at the origin. 22. The second state of the denominator of F(s) must have negative real parts and no more than one can be at the origin. 23. The second state of the denominator of F(s) must have negative real parts and no more than one can be at the origin. 23. The second state of F(s) must be continuous or have a step discontinuity at F(s) and F(s) are second state of F(s) must be continuous or have a step discontinuity at F(s) and F(s) are second state of F(s) and F(s) are second state of F(s) must be continuous or have a step discontinuity at F(s) are second state of F(s) and F(s) are second state of F(s) are second state of F(s) and F(s) are second state of F(s) and F(s) ar