3.1 Table of Laplace transforms

Table 3.1: Common Laplace Transforms.

Name	f(t)	F(s)
Unit impulse	$\delta(t)$	1
Unit step	u(t)	1
•		$\frac{1}{s}$
Unit name	.	
Unit ramp	t	$\frac{1}{s^2}$
		s^2
nth-order ramp	t ⁿ	$\frac{n!}{s^{n+1}}$
		$\overline{S^{n+1}}$
Exponential	e^{-at}	1
1		
nth and an armanantial	$t^n e^{-at}$	s+a
nth-order exponential	t e	$\frac{n!}{}$
		$\frac{n!}{(s+a)^{n+1}}$
Sine	sin <i>oot</i>	ω
		$\frac{\omega}{s^2+\omega^2}$
Cosine		~
Cosine	cos \omega t	$\frac{s}{s^2+\omega^2}$
		$s^2 + \omega^2$
Damped sine	$e^{-at}\sin \omega t$	ω
		$\frac{\omega}{\left(s+a\right)^2+\omega^2}$
Damped cosine	$e^{-at}\cos \omega t$	s + a
		$\frac{s+a}{\left(s+a\right)^2+\omega^2}$
Diverging sine	$t \sin \omega t$	$2\omega s$
		$\frac{2\omega s}{\left(s^2+\omega^2\right)^2}$
	$A\sin \omega t$	$A\omega$
		$\frac{A\omega}{s^2+\omega^2}$
Diverging cosine	t cos wt	
		$\frac{s^2 - \omega^2}{\left(s^2 + \omega^2\right)^2}$
	л Г (->1/2 Л	/
	$e^{-\zeta\omega_n t}\sin\left[\omega_n\left(1-\zeta^2\right)^{1/2}t\right];\zeta<1$	$\omega_n (1-\zeta^2)^{n-2}$
	L , ,]	$\frac{\omega_n \left(1 - \zeta^2\right)^{1/2}}{s^2 + 2\zeta \omega_n s + {\omega_n}^2}$
	$1 - e^{-\zeta \omega_n t} \left(1 - \zeta^2 \right)^{-1/2} \times \sin \left[\omega_n \left(1 - \zeta^2 \right)^{1/2} t + \phi \right]$	$\omega_{\cdot\cdot}^2$
	$1 \left(\begin{array}{ccc} 1 & \zeta & J & \wedge \sin \left[\omega_n \left(1 - \zeta \right) & l + \psi \right] \end{array} \right)$	$\frac{\omega_n^2}{s\left(s^2 + 2\zeta\omega_n s + \omega_n^2\right)}$
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