

Laplace Pairs for Control

Mechanical Engineering

The handful of transforms control engineering actually uses.

All with zero initial conditions, which is the usual control assumption.

Time function	Laplace transform
Unit impulse	1
Unit step	$1 \div s$
Ramp, t	$1 \div s^2$
Decaying exponential	$1 \div (s + a)$
Sine at frequency ω	$\omega \div (s^2 + \omega^2)$
Derivative of f	s times $F(s)$
Integral of f	$F(s) \div s$

Differentiation becomes multiplication by s , so a differential equation becomes an algebraic one.