

DRAFT! Suggestions and comments are invited. 9/27/2005

Information for exam #1 in 421:01, fall 2005

Laplace transforms

Function	Laplace Transform
$f(t)$	$F(s) = \int_0^{\infty} e^{-st} f(t) dt$
$af(t) + bg(t)$	$aF(s) + bG(s)$
t^n (positive integer n)	$\frac{n!}{s^{n+1}}$
e^{at}	$\frac{1}{s - a}$
$\sin(kt)$	$\frac{k}{s^2 + k^2}$
$\cos(kt)$	$\frac{s}{s^2 + k^2}$
$e^{at} f(t)$	$F(s - a)$
$\mathcal{U}(t - a) f(t - a)$	$e^{-as} F(s)$
$g(t) \mathcal{U}(t - a)$	$e^{-as} \mathcal{L}\{g(t + a)\}$
$f'(t)$	$sF(s) - f(0^+)$
$f^{(n)}(t)$	$s^n F(s) - s^{n-1} f(0) - \dots - f^{(n-1)}(0)$
$(f * g)(t) = \int_0^t f(t - \tau) g(\tau) d\tau$	$F(s)G(s)$
$\delta(t - a)$	e^{-as}
$\int_0^t f(w) dw$	$\frac{1}{s} F(s)$
$t^n f(t)$	$(-1)^n \frac{d^n}{ds^n} F(s)$
$f(t + T) = f(t)$ (periodic)	$\frac{1}{1 - e^{-sT}} \int_0^T e^{-st} f(t) dt$

$$\begin{aligned} \sin(A + B) &= \sin A \cos B + \cos A \sin B \\ \cos(A + B) &= \cos A \cos B - \sin A \sin B \end{aligned}$$