First draft 9/30/2004; final draft 10/9/2004

Information for exam #1 in 421:03

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}	$\frac{1}{s-a}$
$\sin(kt)$	$\frac{k}{s^2+k^2}$
$\cos(kt)$	$\frac{s}{s^2+k^2}$
$e^{at} f(t)$	$F(s-a)$
$\mathcal{U}(t-a) f(t-a)$	$e^{-as} F(s)$
$g(t)\mathcal{U}(t-a)$	$e^{-as}\mathcal{L}\{g(t+a)\}$
$f'(t)$	$sF(s) - f(0^+)$
$f^{(n)}(t)$	$s^n F(s) - s^{n-1} f(0) - \ldots - f^{(n-1)}(0)$
$(f * g)(t) = \int_0^t f(t-\tau) g(\tau)\, d\tau$	$F(s)G(s)$
$\delta(t-a)$	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)	$\frac{1}{1-e^{-sT}} \int_0^T e^{-st} f(t)\, dt$

$$\sin(A+B) = \sin A \cos B + \cos A \sin B$$
$$\cos(A+B) = \cos A \cos B - \sin A \sin B$$

The other side presents some matrices and their RREF's.

Information for exam #1 in 421:03

Some matrices and their reduced row echelon forms

NEW BRUNSWICK (3 by 4) $\left(\begin{array}{ccc|c} 1 & 2 & 1 & P \\ 1 & 4 & 4 & Q \\ 1 & 6 & 9 & R \end{array}\right) \sim \left(\begin{array}{ccc|c} 1 & 0 & 0 & 3P-3Q-R \\ 0 & 1 & 0 & -\frac{5}{4}P+2Q-\frac{3}{4}R \\ 0 & 0 & 1 & \frac{1}{2}P-Q+\frac{1}{2}R \end{array}\right)$

PISCATAWAY (3 by 4) $\left(\begin{array}{ccc|c} 1 & 1 & 1 & P \\ 2 & 4 & 6 & Q \\ 1 & 4 & 9 & R \end{array}\right) \sim \left(\begin{array}{ccc|c} 1 & 0 & 0 & 3P-\frac{5}{4}Q+\frac{1}{2}R \\ 0 & 1 & 0 & -3P+2Q-R \\ 0 & 0 & 1 & P+\frac{1}{2}Q-\frac{3}{4}R \end{array}\right)$

The other side has some Laplace transform formulas.