EENG382 QUIZ #3

The exam will consist of ten multiple choice questions and one problem from this quiz.

Problems 16.(22,35,47), 17.(1,2,3,26,35,41)

The attached reference material will be available for Exam III.

The Homework Format Guidelines apply to this quiz, including penalties for failing to abide by them.

The grading on this quiz will be similar to homework grading. Two problems (one from each chapter) will be graded in detail and points based on work shown will be used for the remainder. Each problem will receive 1pt if it is evident that an honest attempt at working the problem has been made. Each problem that is graded in detail will receive an additional 10pts based on quality and completeness. This means that up to 29pts can be earned. The quiz itself is worth 20pts. Any points above 20pts will be treated as extra credit points.

NOTE: Any problem that is not graded in detail will not receive ANY points for effort if there is a systematic disregard for units ANYWHERE within that problem. Any problem that is graded in detail will receive a 40% reduction for any systematic disregard for units with an additional 40% reduction if failing to track or check units resulted in and error that could/should have been caught.

FAIR WARNING: This is the same units policy that will be applied to the exam.

TABLE OF LAPLACE TRANSFORMS

An Abbreviated List of Laplace Transform Pairs

$f(t)$ $(t > 0^-)$	Type	$F(s)$
$\delta(t)$	(impulse)	1
$u(t)$	(step)	$\frac{1}{s}$
t	(ramp)	$\frac{1}{s^2}$
e^{-at}	(exponential)	$\frac{1}{s + a}$
$\sin \omega t$	(sine)	$\frac{\omega}{s^2 + \omega^2}$
$\cos \omega t$	(cosine)	$\frac{s}{s^2 + \omega^2}$
te^{-at}	(damped ramp)	$\frac{1}{(s + a)^2}$
$e^{-at} \sin \omega t$	(damped sine)	$\frac{\omega}{(s + a)^2 + \omega^2}$
$e^{-at} \cos \omega t$	(damped cosine)	$\frac{s + a}{(s + a)^2 + \omega^2}$

An Abbreviated List of Operational Transforms

$f(t)$	$F(s)$
$Kf(t)$	$KF(s)$
$f_1(t) + f_2(t) - f_3(t) + \cdots$	$F_1(s) + F_2(s) - F_3(s) + \cdots$
$\frac{df(t)}{dt}$	$sF(s) - f(0^-)$
$\frac{d^2 f(t)}{dt^2}$	$s^2F(s) - sf(0^-) - \frac{df(0^-)}{dt}$
$\frac{d^n f(t)}{dt^n}$	$s^n F(s) - s^{n-1} f(0^-) - s^{n-2} \frac{df(0^-)}{dt} - s^{n-3} \frac{df^2(0^-)}{dt^2} - \cdots - \frac{d^{n-1} f(0^-)}{dt^{n-1}}$
$\int_0^t f(x)\, dx$	$\frac{F(s)}{s}$
$f(t - a)u(t - a), a > 0$	$e^{-as} F(s)$
$e^{-at} f(t)$	$F(s + a)$
$f(at), a > 0$	$\frac{1}{a} F\left(\frac{s}{a}\right)$
$tf(t)$	$-\frac{dF(s)}{ds}$
$t^n f(t)$	$(-1)^n \frac{d^n F(s)}{ds^n}$
$\frac{f(t)}{t}$	$\int_s^\infty F(u)\, du$

TABLE OF FOURIER TRANSFORMS

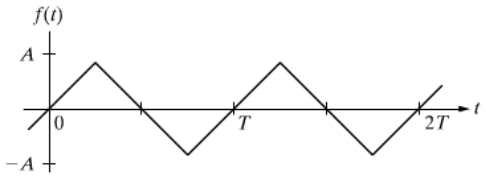
Fourier Transforms of Elementary Functions

$f(t)$	$F(\omega)$
$\delta(t)$ (impulse)	1
A (constant)	$2\pi A\delta(\omega)$
$\text{sgn}(t)$ (signum)	$2/j\text{v}$
$u(t)$ (step)	$\pi\delta(\omega) + 1/j\omega$
$e^{-at}u(t)$(positive-time exponential)	$1/(a + j\omega)$
$e^{at}u(-t)$ (negative-time exponential)	$1/(a - j\omega)$
$e^{-a\|t\|}$ (positive- and negative-time exponential)	$2a/(a^2 + \omega^2)$
$e^{j\omega_0 t}$ (complex exponential)	$2\pi\delta(\omega - \omega_0)$
$\cos \omega_0 t$ (cosine)	$\pi[\delta(\omega + \omega_0) + \delta(\omega - \omega_0)]$
$\sin \omega_0 t$ (sine)	$j\pi[\delta(\omega + \omega_0) - \delta(\omega - \omega_0)]$

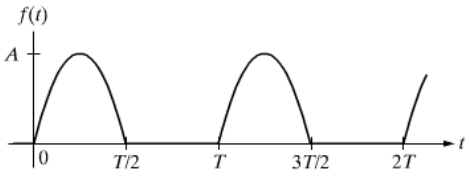
Operational Transforms

$f(t)$	$F(\omega)$
$Kf(t)$	$KF(\omega)$
$f_1(t) - f_2(t) + f_3(t)$	$F_1(\omega) - F_2(\omega) + F_3(\omega)$
$d^n f(t)/dt^n$	$(j\omega)^n F(\omega)$
$\int_{-\infty}^{t} f(x)\,dx$	$F(\omega)/j\omega$
$f(at)$	$\frac{1}{a} F\left(\frac{\omega}{a}\right),\ a > 0$
$f(t - a)$	$e^{-j\omega a} F(\omega)$
$e^{j\omega_0 t} f(t)$	$F(\omega - \omega_0)$
$f(t) \cos \omega_0 t$	$\frac{1}{2} F(\omega - \omega_0) + \frac{1}{2} F(\omega + \omega_0)$
$\int_{-\infty}^{\infty} x(\lambda)h(t - \lambda)\,d\lambda$	$X(\omega)H(\omega)$
$f_1(t) f_2(t)$	$\frac{1}{2\pi}\int_{-\infty}^{\infty} F_1(u)F_2(\omega - u)\,du$
$t^n f(t)$	$(j)^n \frac{d^n F(\omega)}{d\omega^n}$

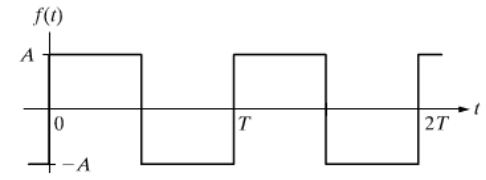
Periodic Functions



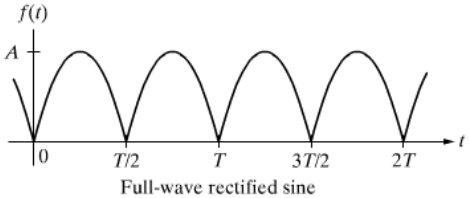
Triangular Wave



Half-wave rectified sine



Square Wave



Full-wave rectified sine