Math 221H - Section 5 - Fall 2009
Laplace Transforms

Functions		**Rules**		
$f(t)$	$\mathcal{L}\{f\}(s)$	$h(t)$	$\mathcal{L}\{h\}(s)$	**Text §**
1	$\dfrac{1}{s}$	$f(t)+g(t)$	$\mathcal{L}\{f\}(s)+\mathcal{L}\{g\}(s)$	**7.1**
e^{at}	$\frac{1}{s-a}, \quad (s>a)$	$cf(t)$	$c\mathcal{L}\{f\}(s) \quad (c \text{ real})$	**7.1**
t^n	$\dfrac{n!}{s^{n+1}}, \quad (s>0)$	$f^{(n)}(t)$	$s^n\mathcal{L}\{f\}(s)-s^{n-1}f(0)-s^{n-2}f'(0)-\cdots$	
$\sin(bt)$	$\dfrac{b}{s^2+b^2}$		$\cdots - sf^{(n-2)}(0)-f^{(n-1)}(0)$	**7.2**
$\cos(bt)$	$\dfrac{s}{s^2+b^2}$	$\displaystyle\int_0^t g(\tau)\ d\tau$	$\dfrac{1}{s}\mathcal{L}\{g\}(s)$	**7.2**
$e^{at}t^n$	$\dfrac{n!}{(s-a)^{n+1}}$	$e^{at}f(t)$	$\mathcal{L}\{f\}(s-a)$	**7.3**
$e^{at}\sin(bt)$	$\dfrac{b}{(s-a)^2+b^2}$	$t^nf(t)$	$(-1)^n\dfrac{d^n}{ds^n}(\mathcal{L}\{f\})(s) \quad (\text{integer } n>0)$	**7.4**
$e^{at}\cos(bt)$	$\dfrac{s-a}{(s-a)^2+b^2}$	$\dfrac{g(t)}{t}$	$\displaystyle\int_s^\infty \mathcal{L}\{g\}(\sigma)\ d\sigma$	**7.4**
$u(t-a)$	$\dfrac{e^{-as}}{s}, \quad (s>0)$	$u(t-a)f(t)$	$e^{-as}\mathcal{L}\{f(t+a)\}(s)$	**7.5**
$\delta(t-a)$	e^{-as}	$u(t-a)f(t-a)$	$e^{-as}\mathcal{L}\{f\}(s)$	**7.5**