

THE UNIVERSITY OF MANITOBA

DATE: December 20, 2023

FINAL EXAMINATION

DEPARTMENT & COURSE NO: MATH2132

TIME: 3 hours

EXAMINATION: Engineering Mathematical Analysis 2 **EXAMINER:** D. Trim

$f(t)$		$F(s) = \mathcal{L}\{f(t)\}$
$t^n \quad (n = 0, 1, 2, \dots)$	\leftrightarrow	$\frac{n!}{s^{n+1}}$
e^{at}	\leftrightarrow	$\frac{1}{s - a}$
$\sin at$	\leftrightarrow	$\frac{a}{s^2 + a^2}$
$\cos at$	\leftrightarrow	$\frac{s}{s^2 + a^2}$
$h(t - a)$	\leftrightarrow	$\frac{e^{-as}}{s}$
$\delta(t - a)$	\leftrightarrow	e^{-as}
$e^{at}f(t)$	\rightarrow	$F(s - a) = \mathcal{L}\{f(t)\}_{ s \rightarrow s-a}$
$e^{at}f(t) = e^{at}\mathcal{L}^{-1}\{F(s)\}$	\leftarrow	$F(s - a)$
$f(t)h(t - a)$	\rightarrow	$e^{-as}\mathcal{L}\{f(t + a)\}$
$f(t - a)h(t - a) = \mathcal{L}^{-1}\{F(s)\}_{ t \rightarrow t-a}h(t - a)$	\leftarrow	$e^{-as}F(s)$
$p - \text{periodic } f(t)$	\rightarrow	$\frac{1}{1 - e^{-ps}} \int_0^p e^{-st} f(t) dt$
$\int_0^t f(u)g(t - u) du$	\leftarrow	$F(s)G(s)$
$f'(t)$	\rightarrow	$sF(s) - f(0)$
$f''(t)$	\rightarrow	$s^2F(s) - sf(0) - f'(0)$