TABLE OF LAPLACE TRANSFORMS

MATH 2584C, SECTION 5, SPRING 2020

Throughout a, b, c are constants, $n \geq 0$ is an integer, and $f(t)$, $g(t)$ are functions.

March 18:

$$\mathcal{L}\{f(t)\} = \int_0^\infty e^{-st} f(t)\, dt$$

$$\mathcal{L}\{1\} = \frac{1}{s} \qquad s > 0$$

$$\mathcal{L}\{t\} = \frac{n!}{s^2} \qquad s > 0$$

$$\mathcal{L}\{t^2\} = \frac{2}{s^3} \qquad s > 0$$

$$\mathcal{L}\{t^n\} = \frac{n!}{s^{n+1}} \qquad s > 0, \qquad n \geq 0$$

$$\mathcal{L}\{e^{at}\} = \frac{1}{s-a} \qquad s > a$$

$$\mathcal{L}\{af(t) + bg(t)\} = a\mathcal{L}\{f(t)\} + b\mathcal{L}\{g(t)\}$$

March 30:

$$\mathcal{L}\left\{\frac{dy}{dt}\right\} = s\mathcal{L}\{y(t)\} - y(0)$$

April 1:

$$\mathcal{L}\{\sin at\} = \frac{a}{s^2 + a^2} \qquad s > 0$$

$$\mathcal{L}\{\cos at\} = \frac{s}{s^2 + a^2} \qquad s > 0$$

$$\text{If } \mathcal{L}\{f(t)\} = F(s) \text{ then } \mathcal{L}\{e^{at} f(t)\} = F(s-a)$$

$$\mathcal{L}^{-1}\{F(s)\} = e^{at}\mathcal{L}^{-1}\{F(s+a)\}$$

April 3:

$$\mathcal{L}\{\mathcal{U}(t-c)\} = \frac{e^{-cs}}{s} \qquad s > 0, \qquad c \geq 0$$

$$\mathcal{L}\{\mathcal{U}(t-c)f(t)\} = e^{-cs}\mathcal{L}\{f(t+c)\} \qquad c \geq 0$$

$$\mathcal{L}\{\mathcal{U}(t-c)g(t-c)\} = e^{-cs}\mathcal{L}\{g(t)\} \qquad c \geq 0$$

April 8:

$$\mathcal{L}\{t\, f(t)\} = -\frac{d}{ds}\mathcal{L}\{f(t)\}$$

$$\mathcal{L}\left\{\int_0^t f(r)\, g(t-r)\, dr\right\} = \mathcal{L}\left\{\int_0^t f(t-r)\, g(r)\, dr\right\} = \mathcal{L}\{f(t)\}\mathcal{L}\{g(t)\}$$

April 10:

$$\mathcal{L}\{\delta(t-c)\} = e^{-cs} \qquad c \geq 0$$