Noodling on the laplace command. Not very satisfactory at simplifying these objects

$?laplace$

$laplace(t^2, t, s)$

$$\mathcal{L}(t^2, t, s) \tag{1.1}$$

$simplify(\%)$

$$\mathcal{L}(t^2, t, s) \tag{1.2}$$

$assume(s > 0)$

$F := t \rightarrow laplace(t, t, s)$

$$F := t \mapsto laplace(t, t, s) \tag{1.3}$$

$F(s)$

$$\mathcal{L}(s\sim, s\sim, s\sim) \tag{1.4}$$

$\lim_{b \to \infty} \left(\int_0^b \exp(-s \cdot t) \cdot 1 \, \mathrm{d}t \right)$

$$\frac{1}{s\sim} \tag{1.5}$$

$simplify(\%)$

$$\frac{1}{s\sim} \tag{1.6}$$

$\lim_{t \to \infty} \left(-\frac{s\, \mathrm{e}^{-s\,t}\, t + \mathrm{e}^{-s\,t} - 1}{s^2} \right)$

$$\lim_{t \to \infty} \left(-\frac{s\, \mathrm{e}^{-s\,t}\, t + \mathrm{e}^{-s\,t} - 1}{s^2} \right) \tag{1.7}$$

Example 2

$assume(s > 0)$

$\int_0^{\text{infinity}} \exp(-s \cdot t) \cdot t \, \mathrm{d}t$

$$\frac{1}{s\sim^2} \tag{2.1}$$

Example 3

$\int_0^{\text{infinity}} \exp(-s \cdot t) \cdot \exp(-3 \cdot t) \, \mathrm{d}t$

$$\frac{1}{s\sim+3} \tag{3.1}$$

$$-e^{-x} \tag{1}$$

#5 (from the textbook)

$$f(t) = \begin{cases} \sin(t) & \textbf{if } 0 \le t < \pi \\ 0 & \textbf{if } t \ge \pi \end{cases}$$

$f := t \rightarrow piecewise(0 \le t < \pi, sin(t), t \ge \pi, 0)$

$$f := t \mapsto \begin{cases} \sin(t) & 0 \le t < \pi \\ 0 & \pi \le t \end{cases} \tag{4.1}$$

$$\int_0^{\text{infinity}} e^{-s \cdot t} \cdot f(t)\, dt$$

$$\frac{1+e^{-\pi s\sim}}{s\sim^2+1} \tag{4.2}$$