

Find the Laplace transform of $g(t) := \begin{cases} 3t & 0 \leq t \leq 1 \\ 3 & 1 \leq t \end{cases}$

$$(3 - 3e^{-s})s^{-2} \frac{3}{s^2} + \frac{3}{s} e^{-3s} s^{-2} (1 - e^{-3s})s^{-2} \frac{3+s}{s^2}$$

$$-1 e^{2\pi i 6} 1 + i \frac{\sqrt{2}}{2}(1 - i)$$

Let $y(x) = u_1(x) \cos(x) + u_2(x) \sin(x)$ be a particular solution of

$$y'' + y = \tan(x), \quad 0 < x < \frac{\pi}{2}$$

given by the method of variation of parameters. Find u_2 . $u_2 = -\cos(x)$ $u_2 = \sin(x)$ $u_2 = \sec^2(x)$
 $u_2 = -\sec(x)$ $u_2 = \cot(x)$

Find the Laplace transform of $f(t) = te^t$.

$$F(s) = \frac{1}{(s-1)^2} \quad F(s) = \frac{1-s}{s^2} \quad F(s) = \frac{1}{s^2} \quad F(s) = s + e^{-s} \quad F(s) = s^{-2} + e^{-s}$$