

HOMEWORK #10 (Chapter 15 Integral Transform Method)

In problem 1, find the general solution by using Fourier transform.

$$(1) \quad y'' - y = e^{-|t|}, \quad x \in (-\infty, \infty), \quad y(\pm\infty) = 0$$

$$\text{Ans: } (-\omega^2 - 1)Y(\omega) = \frac{2}{1 + \omega^2}, \quad Y(\omega) = \frac{-2}{(1 + \omega^2)^2};$$

$$y(x) = \frac{1}{2\pi} \int_{-\infty}^{\infty} \frac{-2}{(1 + \omega^2)^2} e^{i\omega x} d\omega = \frac{-1}{2} [x|e^{-|x|} + e^{-|x|}]$$