

**HOMEWORK 11**  
**DUE: THURSDAY, JUNE 22**

Find the solution of the given initial value problem. Draw the graphs of the solution and of the non-homogenous part of the DE. (Label your graphs appropriately.)

$$(1) \quad y'' + 2y' + 2y = \begin{cases} 1 & \text{if } \pi \leq t < 2\pi \\ 0 & \text{else} \end{cases}, \quad y(0) = 0, \quad y'(0) = 1$$

$$(2) \quad y'' + y = \begin{cases} t/2 & \text{if } 0 \leq t < 6 \\ 3 & \text{else} \end{cases}, \quad y(0) = 0, \quad y'(0) = 1$$

$$(3) \quad y'' + y' + \frac{5}{4}y = \begin{cases} \sin t & \text{if } 0 \leq t < \pi \\ 0 & \text{else} \end{cases}, \quad y(0) = 0, \quad y'(0) = 0$$

$$(4) \quad y'' + y = u_{3\pi}(t), \quad y(0) = 1, \quad y'(0) = 0$$

$$(5) \quad y'' + 4y = u_{\pi}(t) - u_{3\pi}(t), \quad y(0) = 0, \quad y'(0) = 0$$