Mathematics 255—February 12, 1996

Fifth homework—due Friday, February 16

Exercise 1. Graph the functions

(a) $\cos 2x - \sin 2x$

(b) $2\cos 3x - \sin 3x$

(c) $\cos(x/2) + 3\sin(x/2)$

(d) The function

$$\frac{\cos at - \cos bt}{a^2 - b^2}$$

where $a = 1.1$, $b = 1.0$.

Exercise 2. Solve

$$y'' + 2y' + 2y = f(t), \quad y(0) = y'(0) = 0$$

where

(a) $f(t) = 1$

(b) $f(t) = e^t$

(c) $f(t) = \sin t$

(d) $f(t) = 1$ in the range $[0, 1]$ and 0 elsewhere.

Exercise 3. Find the general solution of

(a) $y'' + \omega_0^2 y = \cos\omega t$

(b) $y'' + \omega_0^2 y = \sin\omega t$

(c) $y'' + 3y' + 2y = e^{-t} + 1 + 2\sin t$