HOMEWORK #8 (Chapter 12 Orthogonal functions and Fourier series)

(1). Suppose a uniform beam of length L is simply supported at x=0 and at x=L. If the load per unit length is given by $w(x) = w_0 x / L$, $0 < x < L$, then the differential equation for the deflection $y(x)$ is $EI \dfrac{d^4 y}{dx^4} = \dfrac{w_0 x}{L}$, where E, I, and w_0 are constants.

(a) Expand $w(x)$ in a half-range sine series.

(b) Use the method of Example 4 to find a particular solution $y(x)$ of the differential equation.

(Exercises 12.3 problem 45).

(2). Proceed as in Problem 1 to find a particular solution $y(x)$ (Exercises 12.3 problem 46).
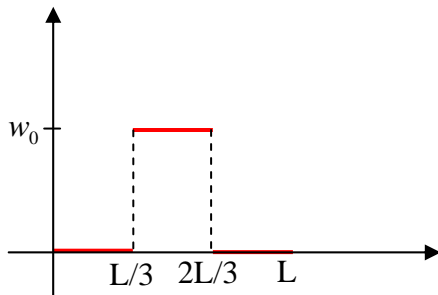

Figure 12.16

when the load per unit length is as given in Figure 12.16.