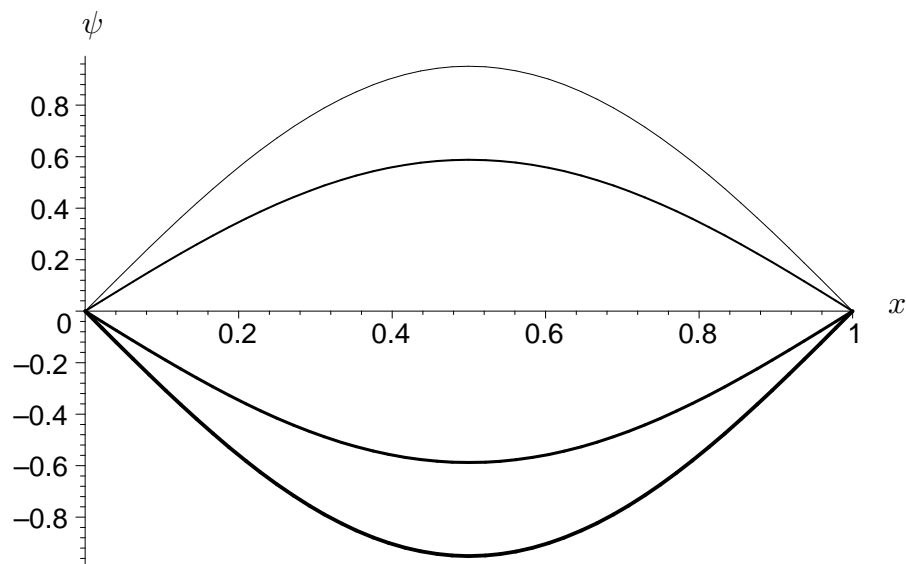


Standing Waves

In class we determined that the normal modes for the wave equation were of the form

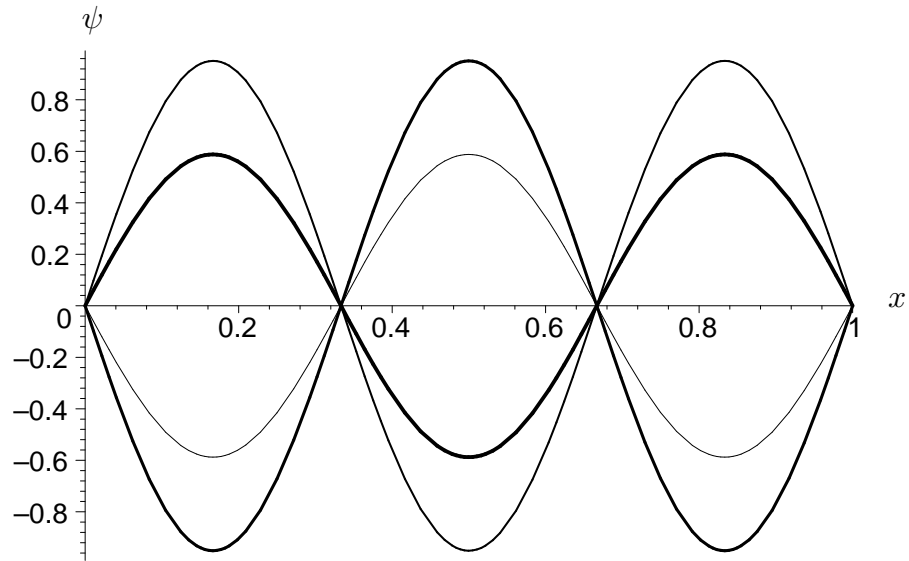
$$\alpha_n \sin(n\pi(t - \theta_n)) \sin n\pi x, \quad (1)$$

where n is an integer. Here is a plot of (1) with $n = 1$, $\alpha_n = 1$, and $\theta_n = 0$.



Normal mode for $n = 1$, $t = 0.4, 0.8, 1.2$, and 1.6 (in increasing order of thickness).

These normal modes are often called *standing waves*; this is because as time passes they don't seem to move in x , they just oscillate. This is shown more clearly in the graph below, which has the same parameters above except now $n = 3$.



Normal mode for $n = 3$, $t = 0.4, 0.8, 1.2$, and 1.6 (in increasing order of thickness).