

3.11.2.2: Reflection Simulation

We already know that a wave which moves from one medium to another can change speed. In many cases this causes a bending of the wave called refraction. A second effect also occurs when a wave goes from one medium to another. There is usually a partial reflection of the wave, depending on how different the two mediums are. Reflection can be of two types, depending on whether the boundary is 'soft' or 'rigid'. If the wave is going from a more rigid medium into a softer medium the reflected wave will have the same phase as the incoming wave. Waves in a soft medium reflecting from a boundary with a stiff medium will change phase by 180 degrees. The simulation below shows this effect.

Simulation Questions:

1. Run the simulation to see how a Gaussian pulse reflects off the two different boundaries. How is a pulse reflected from a fixed boundary different from one reflected from a free boundary?
2. Now check the sine wave check box to see what happens when a sine wave hits the two types of boundaries. What is the end result in these cases? (Hint: Go back to chapter seven and the Adding Sinusoidal Waves simulation where you added two identical sine waves traveling in opposite directions.)
3. Although the reflecting sine waves in both cases interacts with the incoming wave to form a standing waves there is a slight difference between the two. Which case has a node at the boundary and which has an anti-node at the boundary?

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