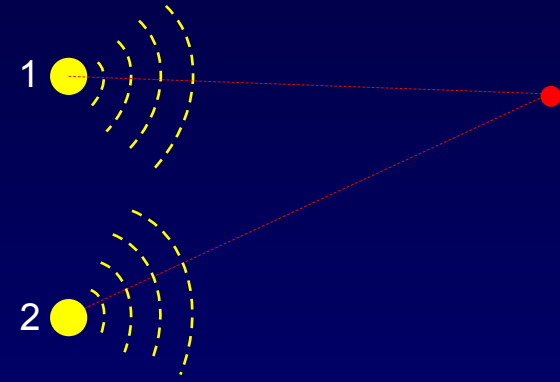


Solution

Two speakers emit equal intensity (call the amplitude $A = 1$) sound of frequency $f = 256$ Hz. The waves are in phase at the source. Suppose that the path difference to the observer is $\delta = 0.3$ m (speaker 1 is closer). $v = 330$ m/s.

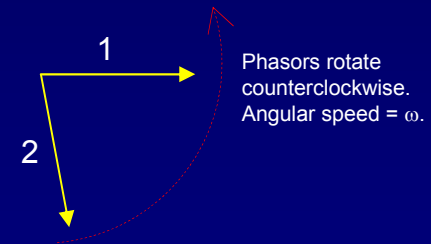
Draw a phasor diagram that describes the two waves at the observer and the resulting wave. What is the resulting amplitude?



The wavelength is $\lambda = v/f = 1.29$ m, so the phase difference is $\phi = 2\pi(\delta/\lambda) = 1.46$ radians $= 83.7^\circ$.

Notes:

- The two phasors have the same length (amplitude).
- We can always pick one phasor to be horizontal.
- Source 2 is farther from the observer, so its phasor lags behind.



Find the resultant by adding the phasors. The resulting amplitude is approximately $\sqrt{2}$. You'll need to use the algebraic solution to get a more accurate answer.

