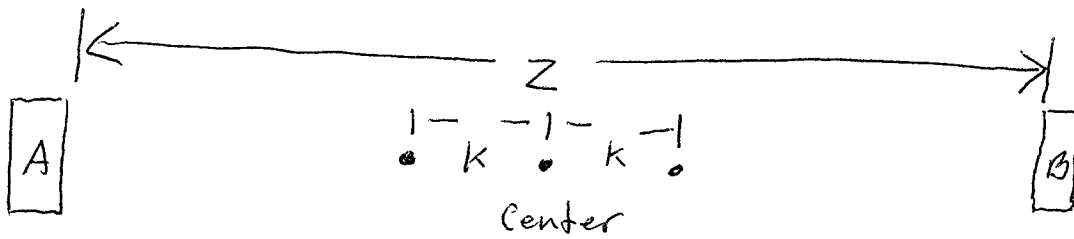


(1)



A person stands between two in-phase speakers that emit the same frequency. If she moves a distance k from the center point of the speakers, she hears a minimum, while at the center she hears a maximum. Express k in terms of λ .

Choose the left of center point.

Then

$$d_A = \frac{1}{2}z - k$$

$$d_B = \frac{1}{2}z + k$$

$$|d_A - d_B| = \left| \left(\frac{1}{2}z - k \right) - \left(\frac{1}{2}z + k \right) \right| = 2k$$

For destructive interference

$$|d_A - d_B| = n \frac{\lambda}{2} \quad n = \text{odd integer}$$

$$\text{so } 2k = n \frac{\lambda}{2} \quad \text{or } \boxed{k = n \frac{\lambda}{4}}$$