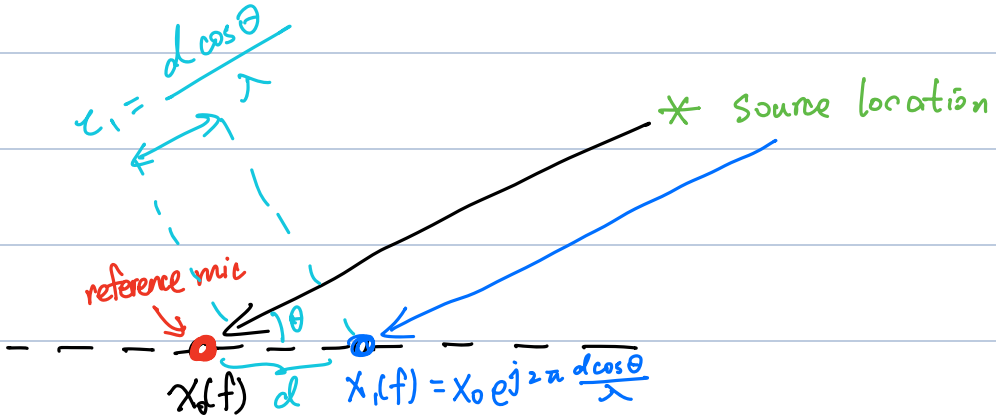
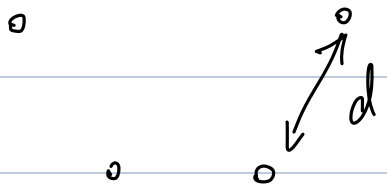
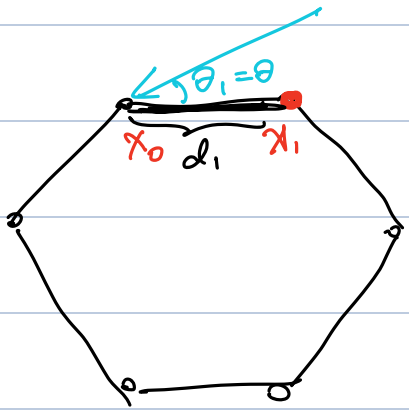
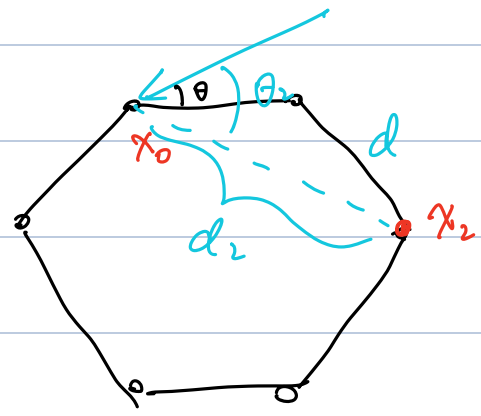


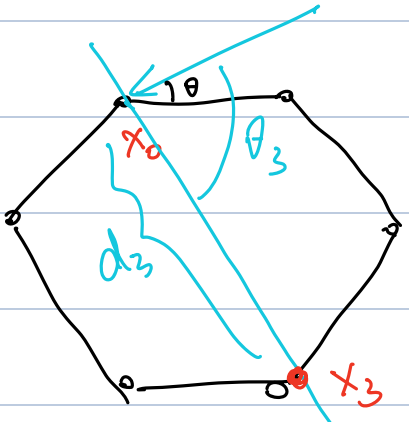




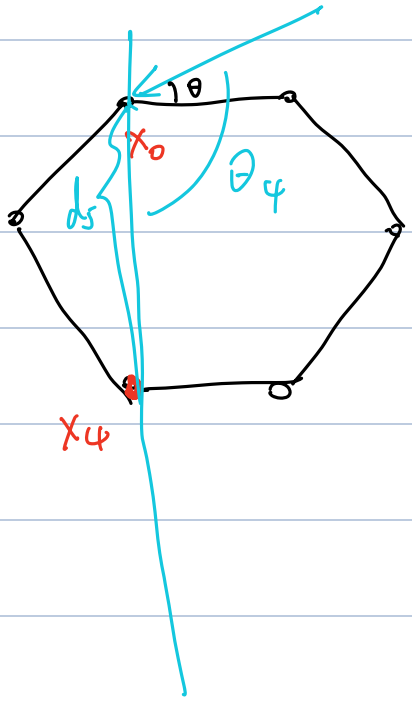
$X_0 \to X_1$: $\begin{cases} \theta_1 = \theta \\ d_1 = d \end{cases}$



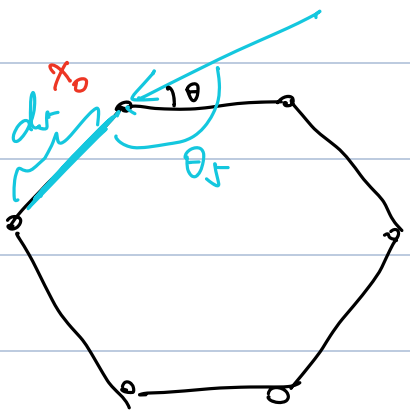
$X_0 \to X_1$: $\begin{cases} \theta_2 = \left(\theta + \frac{\pi}{6}\right) \% (2\pi) \\ d_2 = \frac{d}{2} \cdot \sqrt{3} \cdot 2 = \sqrt{3}d \end{cases}$



$X_0 \to X_3$ $\begin{cases} \theta_3 = \left(\theta + \frac{\pi}{3}\right) \% (2\pi) \\ d_3 = 2d \end{cases}$



$x_0 - x_4$ $\begin{cases} \theta_4 = (\theta + \frac{\pi}{2}) \% 2\pi \\ d_4 = \sqrt{3}\, d \end{cases}$



$x_0 \to x_5$ $\begin{cases} \theta_5 = \theta + \frac{2}{3}\pi \\ d_5 = d \end{cases}$

Overall, Given θ, steer vector for frequency f is:

$$= \begin{bmatrix} 1 \\ e^{j2\pi \frac{d_1 \cos\theta_1}{\lambda}} \\ e^{j2\pi \frac{d_2 \cos\theta_2}{\lambda}} \\ e^{j2\pi \frac{d_3 \cos\theta_3}{\lambda}} \\ e^{j2\pi \frac{d_4 \cos\theta_4}{\lambda}} \\ e^{j2\pi \frac{d_5 \cos\theta_5}{\lambda}} \end{bmatrix}$$

where $\lambda = \frac{c}{f}$ (c: speed of sound)