



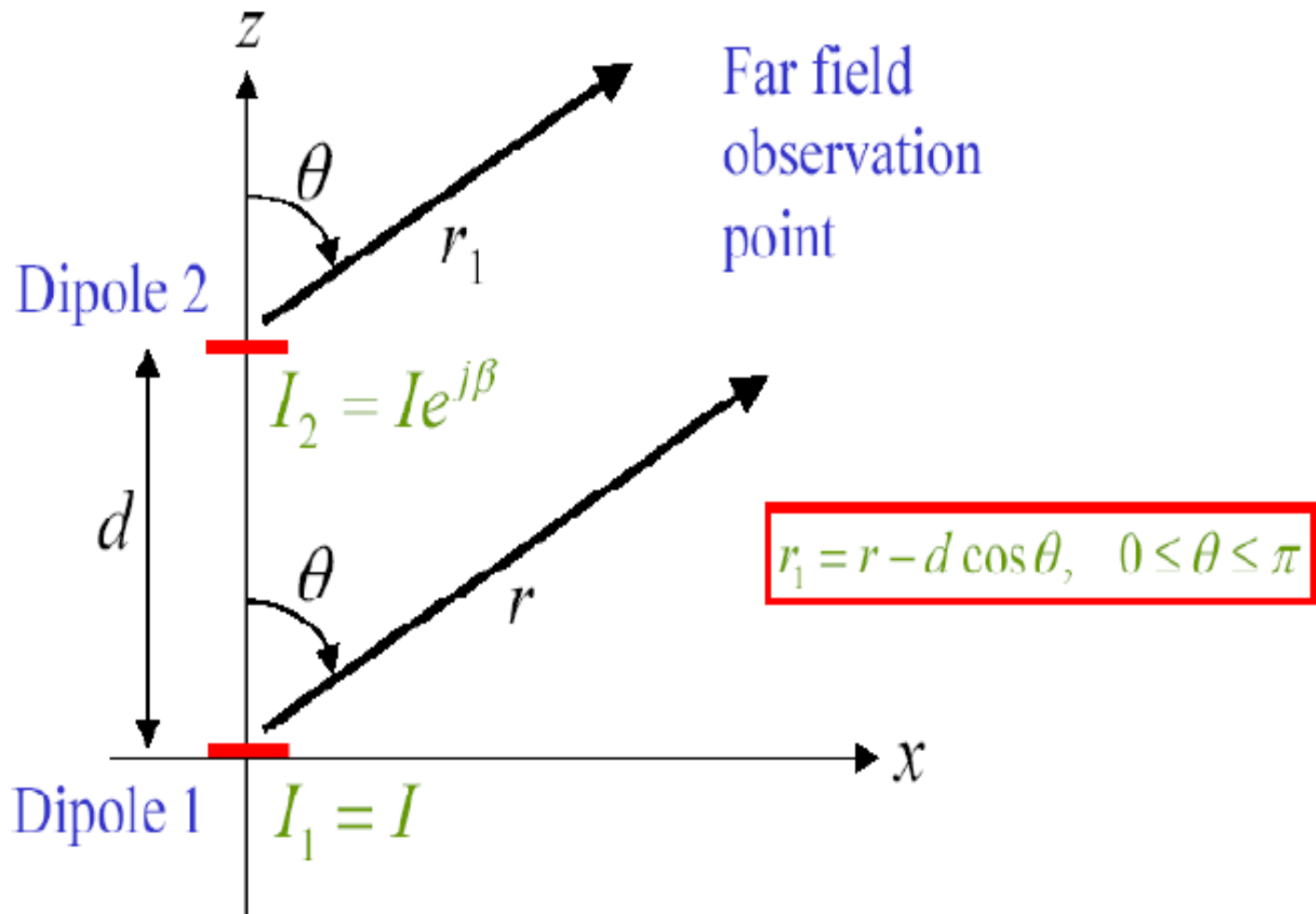
ANTENNA AND WAVE PROPAGATION

ARRAY OF POINT SOURCES

- ARRAY is an assembly of antennas in an electrical and geometrical of such a nature that the radiation from each element add up to give a maximum field intensity in a particular direction& cancels in other directions.
- An important characteristic of an array is the change of its radiation pattern in response to different excitations of its antenna elements.

CASE1:

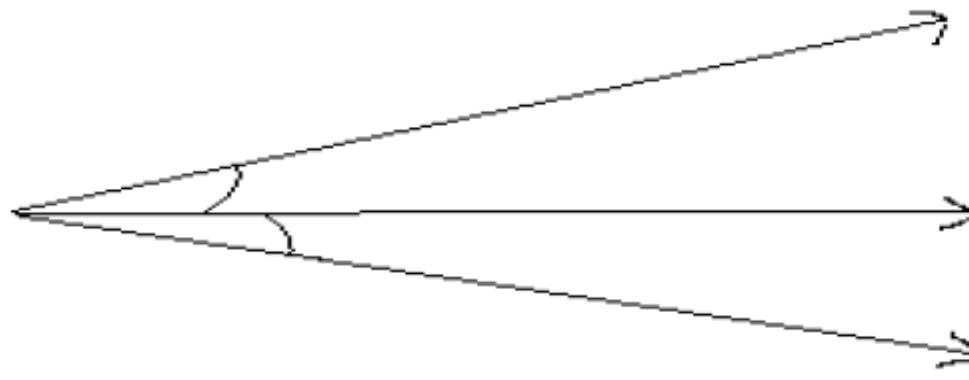
2 isotropic point sources of same amplitude and phase



- **Phase difference** $= \beta d/2 * \cos \theta = 2\pi/\lambda * d/2 * \cos \theta$
 β = propagation constant

and $d_r = \beta d = 2\pi/\lambda * d$ = **Path difference**

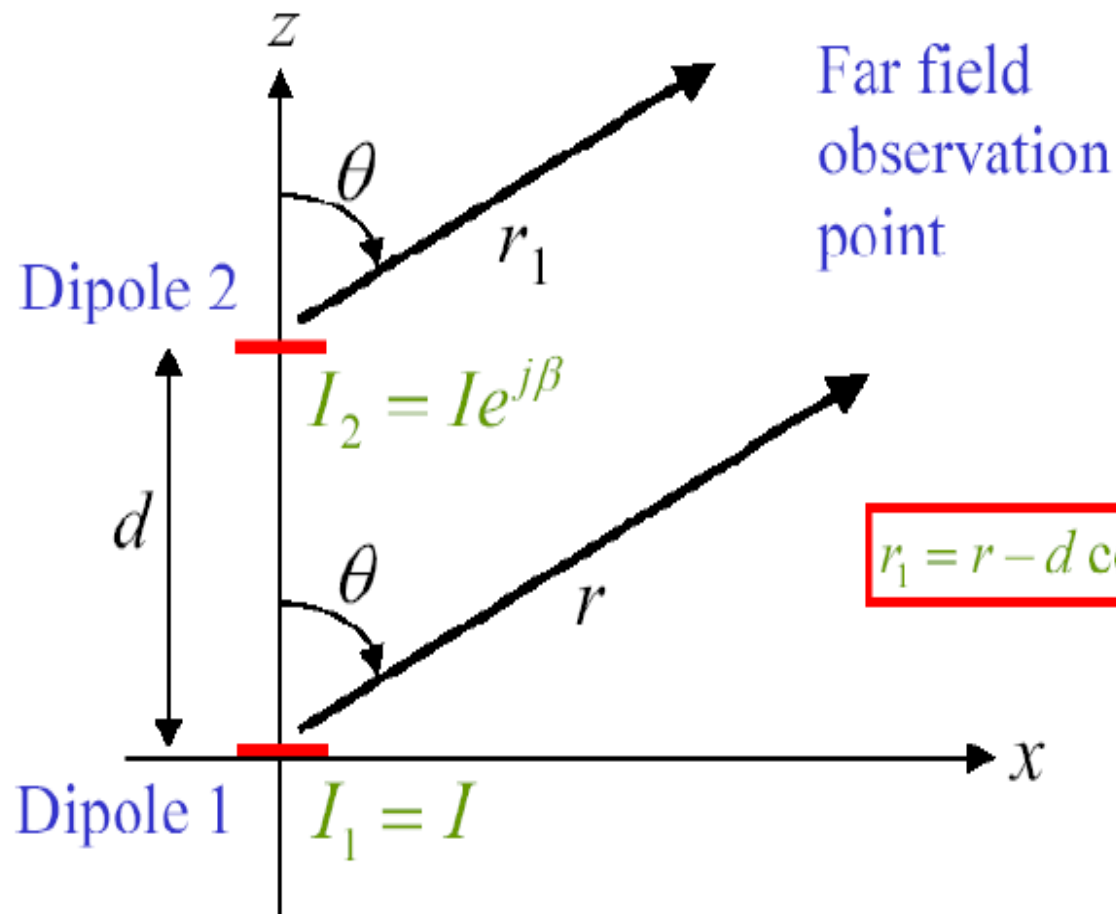
$$E_2 = E_0 \exp(j * \Psi/2)$$



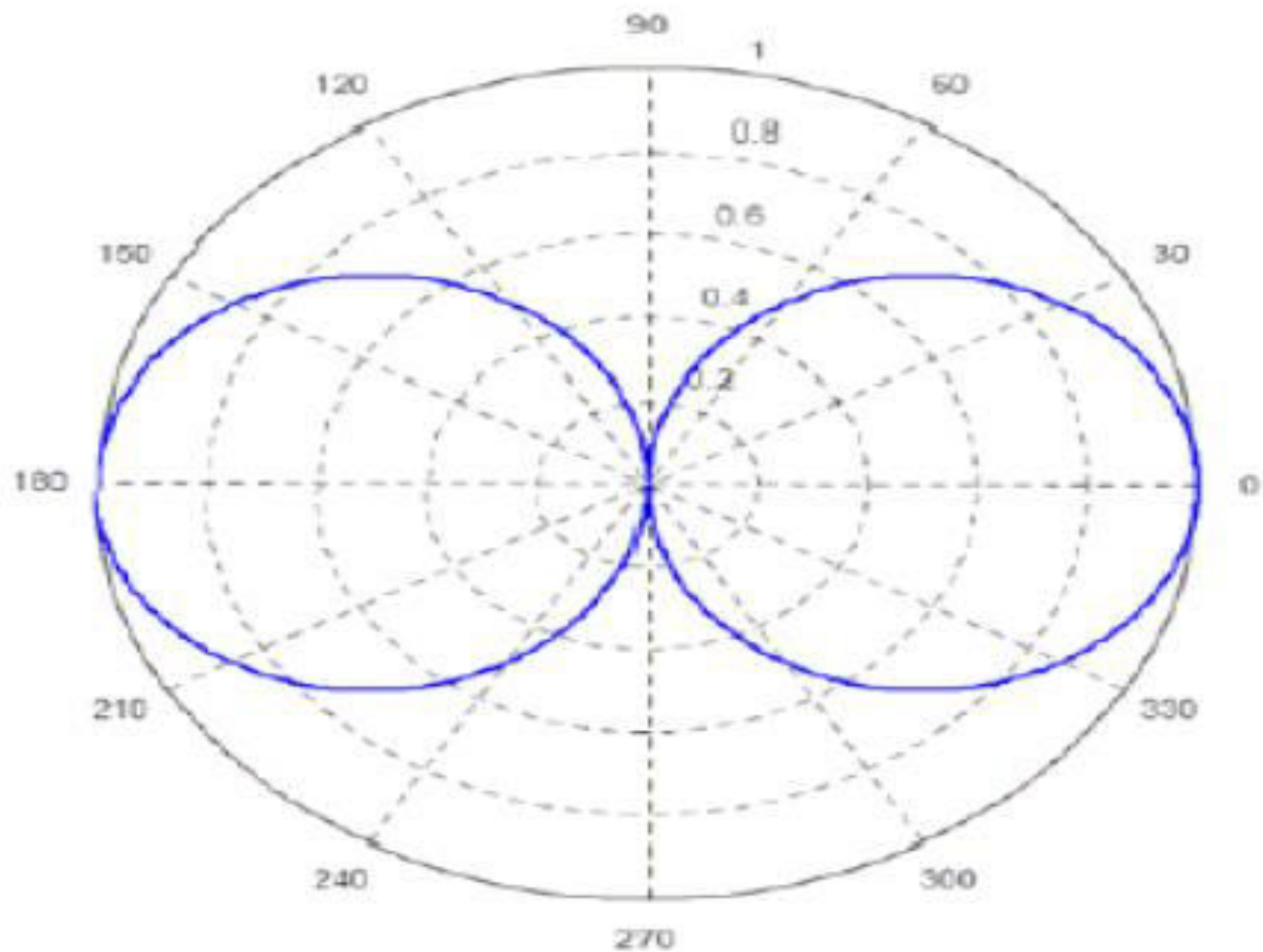
$$\Rightarrow E_1 = E_0 \exp(-j * \Psi/2)$$

CASE2:

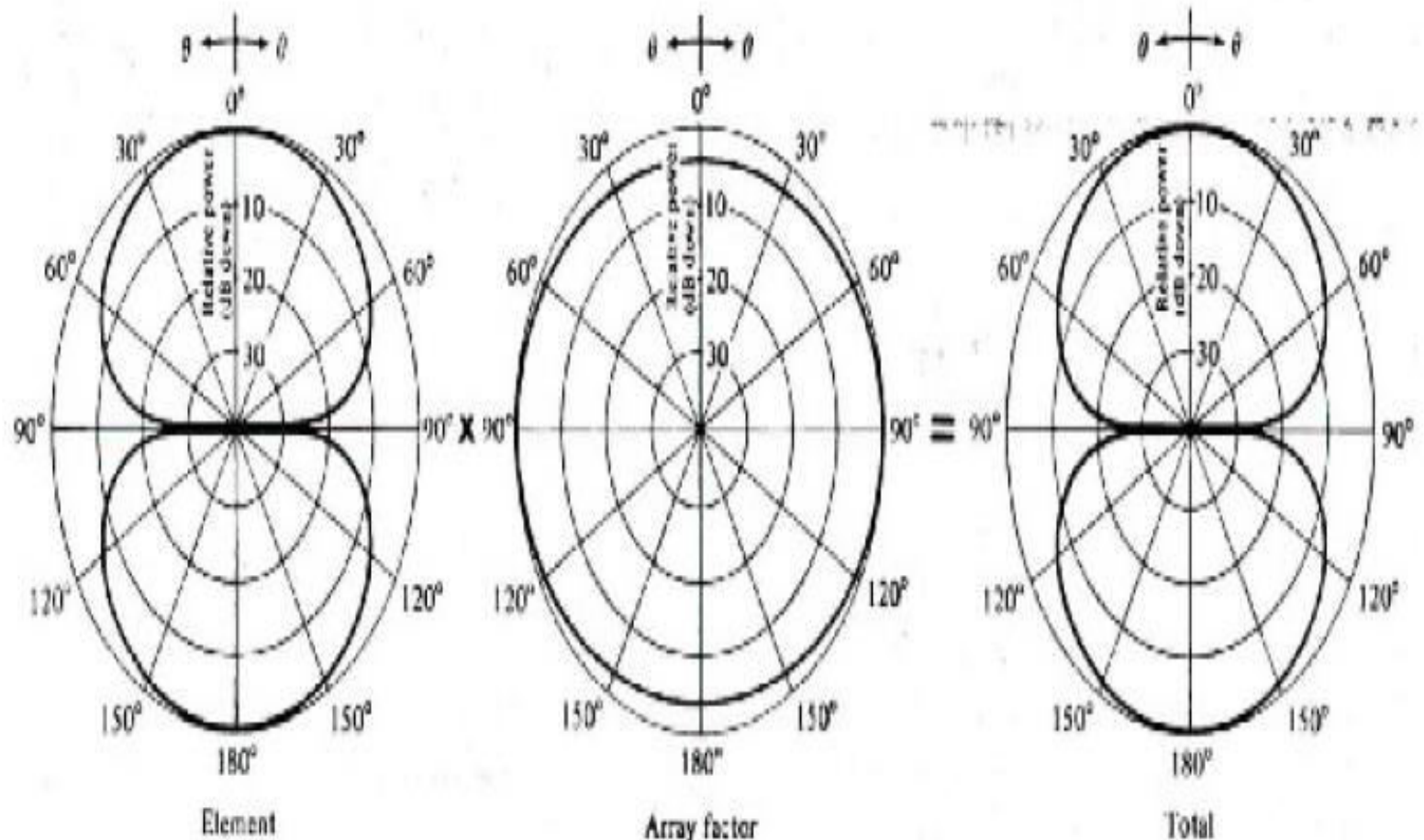
2 isotropic point sources of same amplitude but opposite phase



END FIRE ARRAY PATTERN



Examples of array patterns using pattern multiplication:



Array pattern of a two-element array of Hertzian dipoles ($\beta = 0^\circ$, and $d = \lambda/4$)