
Sheet (7)

1. Design a two-element uniform array of isotropic sources, positioned along the Z-axis a distance of λ/4 apart, so that its only maximum occurs along $\theta=0^o$, assuming end fire conditions (Maximum at $\psi=0$), find the

i. Relative phase excitation of each element.

ii. Array factor of the array.

iii. Directivity.

2. Construct an antenna array using 2-isotropic elements to produce the cardioid radiation pattern shown in figure (1).

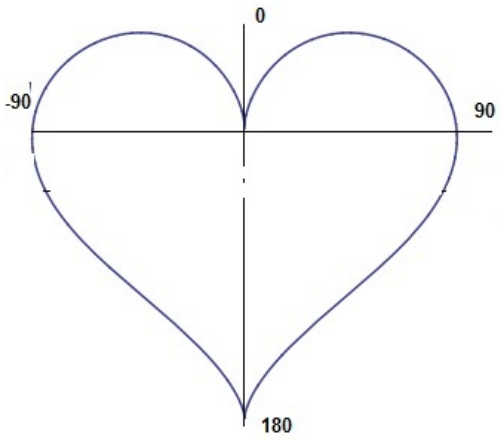

Figure (1)

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3. Two infinetismal (short) dipoles of equal length are equidistant from the origin with their centers lying on the y-axis, and oriented parallel to the z-axis, they are excited with currents of equal amplitude. The current in dipole 1 (at y = -d/2) leads the current in dipole 2 (at y = +d/2) by 90^o in phase. The spacing between dipoles is one quarter wavelength. To simplify the notation, let E_o equal the maximum magnitude of the far field at distance r due to either source alone.

Derive **only** expressions for the following plane patterns

i. $|E_\theta|$ For $\Phi = 0^o$

ii. $|E_\theta|$ for $\Phi = 90^o$

iii. $|E_\theta|$ for $\theta = 90^o$

iv. $|E_\phi|$ for $\Phi = 0^o$

v. $|E_\phi|$ for $\Phi = 90^o$

vi. $|E_\phi|$ for $\theta = 90^o$

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