
Sheet (8)

1. Design a four –element ordinary end fire array with the elements placed along the Z-axis a distance d apart with the maximum of the array factor directed toward $\theta=0^o$. for a spacing of $d=\lambda/2$ between the elements find the

(a) Progressive phase excitation between the elements to accomplish this.
(b) Angles (in degrees) where the nulls of the array factor occur.
(c) Angles (in degrees) where the maximum of the array factor occur.
(d) Beam width (in degrees) between the first nulls of the array factor.
(e) Directivity (in dB) of an array factor.

2. Arrays of 10 isotropic elements are placed along z-axis a distance $d=\lambda/4$ apart. Assuming uniform distribution. Find for both broadside and ordinary end-fire cases the following:

(a) Progressive phase (in degrees).
(b) First side lobe level beam width.
(c) Directivity (in dB).

3. A uniform of 20 isotropic elements is placed along z-axis a distance $\lambda/4$ apart with a Progressive phase shift of "β". Calculate "β" (give the answer in radians) for the following array types:

(a) Broadside.
(b) End-fire with maximum at $\theta=0^o$.
(c) End-fire with maximum at $\theta=180^o$.
(d) Phased array with maximum aimed at $\theta=30^o$.

4. For a uniform broadside linear array of 10 isotropic elements, determine the approximate directivity (in dB) when the spacing between the element is

(a) $\lambda/4$ (b) $\lambda/2$ (c) $3\lambda/4$ (d) λ.

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