Binomial Arrays

To reduce the side lobe level, John stone proposed that sources have amplitudes proportional to the coefficients of the form,

$$(a+b)^{n-1} = a^{n-1} + (n-1)a^{n-2}b + \frac{(n-1)(n-2)}{2!}a^{n-3}b^2 + \dots$$

$n \rightarrow$ no. of sources

No. of sources	Relative Amplitudes
1	1
2	1 1
3	1 2 1
4	1 3 3 1
5	1 4 6 4 1
6	1 5 10 10 5 1

(Fig) (Pascal's Triangle)

Thus coefficients for any number of radiating sources can be obtained from Pascal's Triangle.

→ Elimination of side lobes takes place at the cost of directivity.

* But HPBW of binomial array is more than that of Uniform array for the same length of array.

For $n = 5$, HPBW = 31°,

But for Uniform array → 93°

Advantages

* No secondary lobes

Disadvantages

* High Beam width.
* When designing array of large number of antennas large amplitude ratio is required.