

Series Feed Arrays

1. The arrangement in which energy may be transmitted from one end of the line or it may feed from the center out to each end is known as series feed array.

2. Figure (1) shows a series feed arrangement.



Figure (1)

3. In this, the adjacent elements are connected by a phase shifter with phase shift of ' ϕ '.
4. All the phase shifters are identical i.e., having equal phase shift of less than 2π radians.
5. In a series feed array with N -phase shifters, the signal suffers the insertion loss of a single phase shifter N times i.e., the phase shifter in this case having less loss compared to the phase shifters in parallel feed array.
6. In a series feed array, only a single control signal is needed to steer the beam.
7. An $M \times n$ two-dimensional series feed array requires only two control signals.

Parallel Feed Arrays

1. The arrangement in which energy to be transmitted or radiated is divided between the elements by a power splitter is known as parallel feed array.

2. Figure (2) shows a parallel feed arrangement.

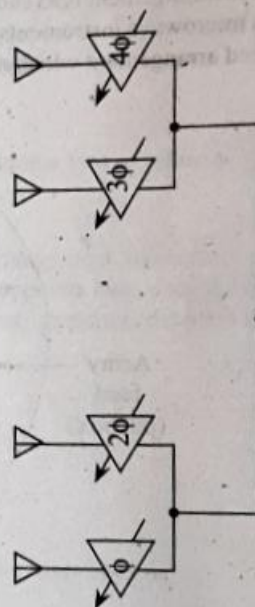


Figure (2)

3. In this, when the phase of the first element is taken as reference, the phase shifts required in the succeeding elements are $\phi, 2\phi, 3\phi, \dots, (N-1)\phi$.
4. In this case, the maximum phase change required for each phase shift is many times 2π radians.
5. In a parallel feed array, the insertion loss of the phase shifter is introduced effectively.
6. In an N -element parallel feed array, a separate control signal is required for each phase shifter i.e., $(N-1)$ phase shifters.
7. An $M \times n$ two dimensional parallel feed array requires $(M+n-2)$ separate control signals.

Series vs parallel feeds

Series feeds

1. Each phase shifter has same phase.
2. Only one steering command is needed
3. High loss in array
4. Losses change with frequency

Parallel feeds

1. Each element has variable phase shifter.
2. $(N-1)$ steering commands are needed.
3. Low loss
4. Almost fixed losses