

## CHAPTER VI

### CONCLUSION AND RECOMMENDATION



The result of receiving the approximate directional pattern from density tapering method of design nonuniformly spaced arrays leads into the applications of an analog computer for improving a radiation pattern. The value of an analog computer is that it can speed the examination of many possible configuration of element - locations and providing their patterns as a visual curve which is the most convenience form of understanding. Perturbation of the - element locations is done on the analog computer for finding the best position of each element that can provide a directional pattern to a desired values.

The investigation of nonuniformly spaced arrays by this way has revealed some interesting properties :

- 1) Nonuniformly spaced array, may be used to obtain the radiation pattern with low sidelobe levels without the need for amplitude taper.
- 2) The minimum sidelobe level occurs when the average element spacing is around 0.85 to 0.95 wavelengths.
- 3) The minimum sidelobe level of nonuniformly spaced-arrays is limited by their number of elements. The higher the number of elements the better the side - lobe level is obtained.

- 4) The far out sidelobe levels, which increase eventually with an observation angle in density tapering method, can be kept below the maximum allowed value in the perturbation method.
- 5) Nonuniformly spaced array with sidelobe level better than those of a uniform array are thinned at the end while those worse are thinned in the center .
- 6) Nonuniformly spaced array contains fewer elements than the uniformly spaced array occupying the same directional pattern.

If one would like to synthesis the pattern with nonuniformly spaced array, the results shown in Fig. 14 and 15 are considered to be useful data.

Unfortunately, nonuniformly spaced arrays containing large number of elements are limited, by the number of computing units in an analog computer, to be operated with the perturbation method. In this case, it is suggested the perturbation to be done with the hybrid computer which employs the co-operation between the digital and analog computer.