CHAPTER V

DISCUSSION

As to the perturbation method done with analog computer of designing nonuniformly spaced arrays , the smaller the number of elements the more convenience the procedures were operated, since less computing units and times are used for perturbing the element locations. The number of analog computing units contained in an analog computer gives the limit to the number of elements assigned for the array. It can be seen from the block diagram in - page 15 that this method requires the number of integrator units equal to the number of elements in the array including the summing amplifier units about a half. For example, if the analog computer employed for the calculation consists of 20 summing integrators and 11 summing amplifiers, the maximum number of elements in the array that can be synthesis by this method is equal to 21 .

Nonuniformly spaced array with smaller number of element provides the pattern of higher sidelobe level and wider beamwidth. If the number of element is too small (lower than 6), the sidelobes achieved from nonuniformly spaced arrays are not much better than of equally spaced arrays as can be seen from figure 15, and the minimum average sidelobe level that can be provided from 10 element nonuniformly spaced array is only equal to 0.17 or -15.39 dB .

The comparison between the directional patterns obtained from the theoritical design and the experiment was shown in Fig.18. It must be remembered that the former is the pattern of the isotropic sources but the latter is the pattern of the half-wave dipole array. These two patterns are related by the law of pattern multiplication The sidelobe level of the theoritically designed pattern is 0.? and the beamwidth is 10 degrees,while the corresponding values of the practical array are 0.48 and 17 degrees respectively .

Some of these differences are due to the generally practical effects. The first, it is not easy to ascertain the accurate element excitation because of mutual interaction between elements. Each element is influenced by neighbouring elements. The second, the surrounding enviroment affect the recieving signal by mean of reflection . It is found that changes in the testing place provide some differences in the directional pattern . Another practical problem is that it is difficult to make all radiating elements be identical as required for the theoritical considerations .