SUMMARY

A conformal transformation developed for the analysis of an asymmetric strip line has been extended in the present thesis to the case of a microstrip line by considering it as a limiting case of an asymmetric strip line. Using the same transformation symmetric and asymmetric strip lines with layered dielectric substrate are also analysed.

Investigations on the coupling coefficient between a microstrip line and a rectangular waveguide coupled through rectangular slots and circular holes are made for the following cases :

- i) Microstrip line and rectangular waveguide with their axes parallel
- ii) Microstrip line and rectangular waveguide forming a Tee-junction
- iii) Cross-guide coupler.

An equivalence between a microstrip line and a parallel plate guide is used for the purpose of calculation of the field distribution required for the determination of the coupling coefficient.

Impedance properties of a transverse slot in the ground plane of a microstrip line are studied. The field distribution in the microstrip line required for this purpose is extrapolated from that of a strip line with rectangular outer boundaries and layered dielectric substrate, by assuming that the distance between the side walls is large and the upper; plate is moved to infinity. A method of analysis of elliptic strip line is presented using the solution of Laplace's equation in curvilinear elliptic coordinates. The method is used to find the characteristic impedance and potential distribution of elliptic and cylindrical strip lines filled with homogeneous dielectric media. The impedances of these lines are also determined by conformal mapping method and comparison between the two results is presented.

The characteristic impedances of the elliptic and cylindrical strip lines, filled with different dielectric substrate, is also determined from the solution of Poisson's equation. The method is also used to find the characteristic impedance of elliptic and cylindrical microstrip lines.

The effect of environmental changes on the impedance of an otherwise planar structure is estimated.