CHAPTER I

INTRODUCTION

The analysis and study about the properties of a short cylindrical dipole antenna and a thin cylindrical antenna have been considered by many authors. However, the analysis and study about the properties of a thick cylindrical antenna has received little consideration due to the complexity of the problem. Hallen (4) and L. V. King (5) have derived approximate expressions for the current distribution and impedance of a cylindrical antenna. More recently the problem has been discussed by Synge (11) and Albert (1). C. Y. Ting (12) has made the theoretical study of a cylindrical antenna with a hemispherical cap. However according to the author's knowledge. The analysis and study of a hollow cylindrical antenna has not been considered yet.

In this research, the analysis is aimed at a hollow cylindrical antenna as shown in Fig. 1. The antenna is assumed to be made of a nearly perfect conductor. It is dimensioned such that the thickness t is negligible compared to the radius a, and $2l$ is the length of the antenna.
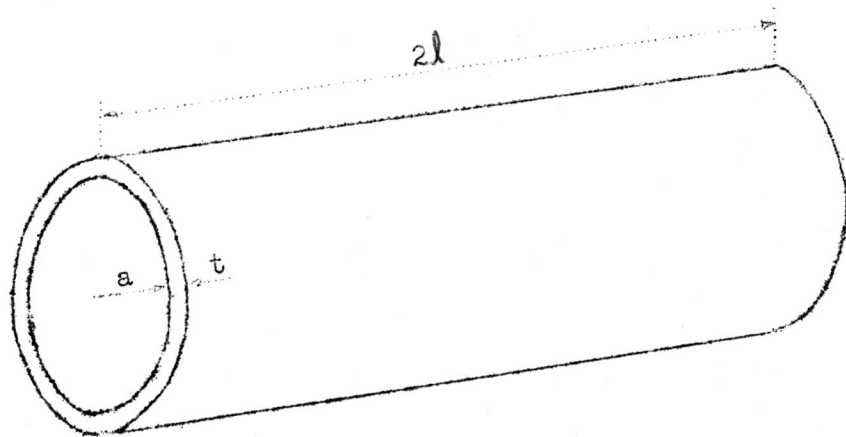
Fig. 1 A Hollow Cylindrical Antenna

In the analysis, the two types of current distributions are assumed along the antenna. First, a uniform current distribution and then a sinusoidal current distribution. With each distribution, the expressions of field pattern and gain are derived and checked by a series of experiments. The results from this thesis might be useful for any work that a hollow cylindrical antenna is desired. The theory developed may serve as a potential guidance work for further study.