CHAPTER I

INTRODUCTION

In one dimension a function $f(x)$ can be represented by a Fourier series. Similarly, a straight wave in two dimensions can be represented by a Fourier-Bessel series. In chapter II we shall find this representation by using an integral repre--sentation for the Bessel function, and we shall use numerical calculations to illustrate partial sums containing one term, three terms and five terms.

In chapter III, we study the application of this repre--sentation to the scattering of straight waves by a circular object. At the beginning of this chapter we shall find a formula for the scattered wave. The rest of chapter III is concerned with the numerical calculations. We shall consider the case in which the diameter of the scatterer is about two times the wavelength. We shall determine the shape of the wave near the object by calculating numerically partial sums of the series representation.

Although many textbooks give formulas for the waves in problems such as this, one cannot visualize the shape of the wave because they do not give a well illustrated treatment of this phenomenon. Therefore this thesis work will be a useful contribution in this respect.