

ON THE CHARACTERISTIC VALUES OF LINEAR INTEGRAL EQUATIONS.

BY

EINAR HILLE and J. D. TAMARKIN.

PRINCETON, N.J.

PROVIDENCE, R.I.

I. Introduction.

1. 1. The present paper is concerned primarily with the following question: *What can be said about the distribution of the characteristic values of the Fredholm integral equation*

$$(1. 1) \quad y(x) = \lambda \int_a^b K(x, \xi) y(\xi) d\xi$$

on the basis of the general analytic properties of the kernel $K(x, \xi)$ such as integrability, continuity, differentiability, analyticity and the like?

The literature where this and analogous questions are treated is very considerable [HELLINGER-TOEPLITZ, 1].¹ A relatively small part of this literature, however, has points of contact with the present paper, the discussion of the majority of papers published on the subject being based on various special properties of the kernels. It is assumed frequently that the kernel belongs to some special class of functions, or that it coincides with the Green's function of a differential or integro-differential boundary value problem. Problems of this sort will be excluded from the scope of our paper although they are interesting from a theoretical point of view and important for the applications.

¹ The quotations in brackets [] refer to the list of memoirs at the end of this article.