*The Annals of Mathematical Statistics*
1970, Vol. 41, No. 6, 1817–1844

# EXTRAPOLATION AND INTERPOLATION OF STATIONARY GAUSSIAN PROCESSES[1]

BY H. DYM AND H. P. MCKEAN

*The City College of CUNY and The Rockefeller University*

## CONTENTS



**1. Introduction.** The problem of extrapolation of a stationary Gaussian process $\mathfrak{x}$ using the whole past $\mathfrak{x}(t): t \leqq 0$ was solved about 1940 by A. N. Kolmogorov [15], M. G. Krein [16], and N. Wiener [27]. The purpose of this paper is to present the mathematical tools needed to solve the extrapolation problem if only part of the past is available. M. G. Krein [20] did this by applying the solution of the inverse spectral problem as initiated by Gel'fand–Levitan [10] and perfected by himself [17–19]. Dym–McKean [8] used a second method involving spaces of integral (entire) functions, of the kind introduced and extensively studied by L. de Branges [5, 6].

Both methods take advantage of the fact that the study of the short process $\mathfrak{x}(t): |t| \leqq T+$ is isomorphic, via the map $\mathfrak{x}(t) \to \exp(i\gamma t)$, to the study of the class of

Received April 28, 1970.

[1] This paper is an amplification of an expository talk by the second author at the August 1969 meeting of the Institute of Mathematical Statistics in New York. The invitation to place it before a wider audience in its present form is gratefully acknowledged.