EXPERIMENTAL CORRELOGRAM ANALYSES OF ARTIFICIAL TIME SERIES (WITH SPECIAL REFERENCE TO ANALYSES OF OCEANOGRAPHIC DATA)

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1. Introduction

When dealing with data as they come from nature, the applied statistician is frequently faced with the prospect of selecting and modifying theoretical mathematical methods to fit the special conditions imposed by the data themselves. Since theoretical mathematical tools are developed for specific situations they may become unsafe for applications outside the framework for which they were originally intended. Observations on natural phenomena cannot usually be controlled in the sense of a controlled laboratory experiment, and for obvious reasons, they are finite in scope. Hence, some form of experimental modification of theoretical formulae is usually essential if the maximum correct information is to be obtained from the data.

Data dealing with time variations of natural phenomena usually leave much to be desired in that the lengths of observed series may be woefully short, they are masked by various degrees of error and are sometimes sporadic and disconnected. Furthermore, the dynamics of the generating mechanisms are frequently not known, so that *a priori* considerations are purely speculative. A further complication concerns the length of the time series to be utilized for computation. The individual members of the series being dependent, one on the other, so that regardless how many are chosen, within practical limits, the number becomes small in light of the requirements imposed by random sampling. A further point of

This paper is contribution No. 531 from the Woods Hole Oceanographic Institution and U.S. Navy Office of Naval Research Contract No. N6onr 277 Task Orders 1 and 8. At the time of his death on March 7, 1951, the author was a John Simon Guggenheim Memorial Fellow, 1950–1951.