STATISTICAL ANALYSIS OF ONE-DIMENSIONAL DISTRIBUTIONS

By

ROBERT SCHMIDT

The present research is to be considered as a contribution to a range of science in which the pioneer work has been done by K. PEARSON. The method for analysing statistical distributions to be developed here differs in principle—as far as the author can see—from the known ones. The mathematical resources are all well known and so simple that their deduction *ab ovo* could be carried through on a few pages; hence this investigation is intelligible to anyone who remembers his mathematical knowledge acquired at school.

The main resource consists of the process of orthogonalization, fundamental in the theory of integral equations. The central idea characterizing the following is, not to deal with a frequency function itself, nor with its integral function, but with the *inverse* of the integral function. The general scope will be given in No. 3.

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1. DESIGNATIONS AND GENERAL ASSUMPTIONS

A curve $y=\varphi(x)$, $(-\infty<x<+\infty)$ shall be called a *"frequency curve"*, the function $\varphi(x)$ a *"frequency function"*, if $\varphi(x)$ satisfies the following conditions:

1. $\varphi(x) \geqq 0 \qquad (-\infty<x<+\infty)$
2. *The moments* $\mu_\kappa = \int_{-\infty}^{+\infty} x^\kappa \varphi(x)\, dx$ *exist for* $\kappa=0,1,\ldots$ [1]
3. $\mu_0 = 1$.

For our purposes it is convenient—though not necessary—to

[1] In this paper we shall not have to make use of the second condition (except in the special case $\kappa=0$); in further notes, too, the condition will never be applied to its full extent.