VI OUTLINE OF A GENERAL THEORY OF STATISTICAL INFERENCE

The theories of Fisher, Neyman and Pearson are restricted in two respects. First, they consider only the problem of testing a hypothesis and that of estimation by point or interval. The second restriction is that only the case in which Ω is a k-parameter family of distribution functions is investigated. Both restrictions are serious from the point of view of applications.

There are many important statistical problems which are neither problems of testing a hypothesis, nor problems of estimation. We havè already given such an example in Section 1. As a further illustration, let us consider the following case: Let $X_1, \ldots, X_p$ be p independently and normally distributed random variables with unit variances and unknown means $\theta_1, \ldots \theta_p$. Furthermore, let $x_{i1}, \ldots, x_{in}$ be n independent observations on $X_i (i = 1,2,\ldots,p)$. Suppose we test the hypothesis that $\theta_1 = \ldots = \theta_p = 0$, and decide to reject this hypothesis on the basis of the pn observations $x_{i\alpha} (\alpha = 1,2,\ldots,n;\ i = 1,2,\ldots,p)$. In such cases we are usually interested in knowing which mean values are not zero, i.e., we wish to subdivide the set of p mean values $\theta_1, \ldots, \theta_p$ into two subsets, such that one of them contains the mean values which are zero and the other the mean values which are not zero. This subdivision has to be done, of course, on the basis of the pn observations $x_{i\alpha}$. More precisely, we have to deal with the following statistical problem: There exist 2^p different subsets of the set $(\theta_1, \ldots, \theta_p)$. Denote these subsets by $\omega_1, \ldots, \omega_{2^p}$, respectively. Let H_k