NOTE ON KOSHAL'S METHOD OF IMPROVING THE PARAMETERS OF CURVES BY THE USE OF THE METHOD OF MAXIMUM LIKELIHOOD

By

R. J. MYERS

It has been shown by R. A. Fisher[1] that the most efficient parameters for Pearsonian curves may be found by the method of maximum likelihood. In applying this method we maximize the quantity

$$(1) \qquad L = \sum n_\kappa \log p_\kappa$$

by varying the parameters of the curve; n_κ denotes the observed frequency of the κth class, and p_κ is the probability of an observation falling in this class as determined from the curve and is thus a function of the parameters. Thus, in maximizing L, p_κ varies as the parameters are varied, but n_κ remains constant throughout since it is fixed by the given data.

Usually it is impossible to obtain a solution to the maximum likelihood equation so that some method of approximation must be used. R. S. Koshal[2] has devised a very ingenious method of approximation, which can be summarized briefly as follows. Values of L are obtained first by varying only one parameter at a time, and then by varying two parameters at the same time. When only one parameter is varied, two values of L are computed for each parameter, whereas in the case of two parameters being varied, only one value of L is computed for each combination of parameters. Thus, $2n + {}_nC_2 + 1$ or $\frac{1}{2}(n+1)(n+2)$ values of L would be needed for n parameters. With these $L's$ the constants of n simultaneous equations involving the n corrections to the n parameters can be determined, and then the corrections themselves can readily be obtained.

In applying this method a number of interesting results were