

L7F February 1943

Dear Mr Lyle,

I see now what you mean by the Fiducial Limits of the estimate from a regression-equation and, of course, I agree with it, on the understanding as always that it is rightly applied. The kind of thing I mean is this: the regression-equation and the errors of estimation associated with the statistics derived from it are obtained from certain values 'y', e.g. Costs, observed in connexion with values 'x', e.g. Rate of Output. The y-values observed in such cases would seem to have, according to circumstances, very different absolute precisions, even though all are appropriate for estimating the same regression-line, e.g. the Cost assessed from the experience of one day would be less accurate than that based on the experience of a week. We may suppose in such cases that there is a true Cost appropriate, other things being equal, to the chosen Rate of Output but that observations relating to one day will differ much from it by errors of observation, while values observed over a week will deviate less. The fiducial limits given by your formula are appropriate to the question: Given the Rate of Output, within what limits will the Cost observed in one day fall, if predicted

from the given Rate of Output by means of the regression-equation ?  
Owing to errors of observation these limits will be wider, perhaps  
much wider, than if from the same given Rate of Output we estimated the  
limits for the cost observed over a week or for the true cost on the  
supposition of working indefinitely with unchanged conditions.

On your last question, I think the most convenient safeguard is  
to speak of a fiducial probability in connexion with the figure quoted  
or state that the probability is calculated from a fiducial argument.  
A fiducial probability is unquestionably an ordinary probability as  
understood in the classical Theory of Probability just as an inverse  
probability is, but they relate the same class of events to different  
conceptual populations of events, just as a man may have a different  
chance of dying of tuberculosis according to whether he is regarded  
as a typical member of the population of Males or of the population of  
Jamaicans. He may in fact belong to both populations, but the probability-  
statement does not refer intrinsically to him but to the population of  
which he is considered to be a member.

Yours sincerely,