THE SAMPLING VARIABILITY OF LINEAR AND CURVILINEAR REGRESSIONS

A FIRST APPROXIMATION TO THE RELIABILITY OF THE RESULTS SECURED BY THE GRAPHIC "SUCCESSIVE APPROXIMATION" METHOD

By

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Many statistical problems involve determining the change in one variable with changes in each of several others, all operating at the same time. Linear multiple correlation provides a method of making this determination, on the assumption that all the relations are linear. In many problems this assumption is not valid. To determine curvilinear relations without making assumptions as to the type of each curve except that it be a continuous function, a method of successive approximations by graphic fitting was presented six years ago; and it was demonstrated empirically that in cases of high correlation this method successfully determined the underlying curves.[2] It was also pointed out that multiple regression curves could be fitted by the least-squares method. if specific parabolae or other first-degree equations were assumed for each variable, following methods previously sug-suggested by Yule.[3]

1. Formerly Senior Agricultural Economist, United States Department of Agriculture.
2. Ezekiel, Mordecai. A Method of Handling Curvilinear Correlation for any Number of Variables. Quart. Pub., Amer. Stat. Assoc., XIX, No. 148, Dec., 1924.
3. Yule, G. U. "On the Theory of Correlation," Jour. Roy. Sta. Soc., Vol. LX, p. 817 (1897). Apparently Wicksell had also suggested fitting regression curves to several variables simultaneously. Wicksell, S. D., Annals of Math. Stat., Vol. I, No. 1, pp. 3-15. Feb., 1930.