

# ON CERTAIN PROPERTIES OF FREQUENCY DISTRIBUTIONS OBTAINED BY A LINEAR FRACTIONAL TRANSFORMATION OF THE VARIATES OF A GIVEN DISTRIBUTION

By

H. L. RIETZ

Considerable evidence has been presented by R. A. Fisher<sup>1</sup> to show that, by an appropriate transformation  $z = f(r)$  of small sample correlation coefficients  $r$  ( $-1 \leq r \leq 1$ ) distributed in accord with a decidedly skew frequency curve, values of  $z$  are obtained which are distributed nearly in a normal distribution. In fact, the approach of the distribution of  $z$  to normality seems sufficiently rapid to justify the use of the probable error of  $z$  in many applications as if it were normally distributed. Such a change in the character of the distribution of an important statistic suggests the further study of properties of the distribution of variables obtained by applying rather simple transformations to variates distributed from  $-1$  to  $+1$  in accord with a given frequency function. In a previous paper,<sup>2</sup> the writer has dealt with a similar problem when each variate of a given unimodal distribution of any finite range is replaced by a given power of the variate.

Consider a positive unimodal continuous frequency function

---

<sup>1</sup> *Metron*, Vol. 1, Part 4 (1921) pp. 3-32.

<sup>2</sup> *Proceedings of the National Academy*, Vol. 13, No. 12 (1927), pp. 817-820.