

THE DISTRIBUTIONS OF THE PRECISION CONSTANT AND ITS SQUARE IN SAMPLES OF n FROM A NORMAL POPULATION

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INTRODUCTION

The following paper is a study of the properties of the distributions of the precision constant and its square in samples of from a normal population. The properties studied are (1) modes and optimum values, (2) the first four moments, (3) skewness and flatness, and (4) medians and quartiles.

The distribution curves shown in the figure are for $n=4, 10, \text{ and } 25$. All the curves are drawn together and to the same scale, so that a graphical comparison of the two distributions can be easily made for both the same and different values of n . The numerical values for the various parameters given in the tables are for $n=4, 10, 25, \text{ and } 100$, except in the case of the medians and quartiles where the values for $n=100$ are omitted, and in case of $n=4$, no moments higher than the second exist for the precision constant, and none higher than the first for the precision constant squared distribution.

1. Distributions

Let us denote the standard deviation, precision constant, and the precision constant squared of the parent population by $S, H,$ and U , respectively, and those of a sample from the given population by $s, h,$ and u , respectively. The standard deviation, S , is then defined in terms of the variates, x_1, x_2, \dots, x_n and its mean \bar{x} by the equation

$$S^2 = \frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2 \dots \dots \dots (1.0)$$