NASA TECH BRIEF

Independent Doubly Truncated Gamma Variables

The Gamma distribution serves as a model for describing many of the random variables associated with the measurement of complex phenomena, such as wind velocities, which conform to this distribution. Quite often, restrictions which apply to the observation of sample data from the distributions, in effect, produce a truncation which must be taken into account in estimating parameters and in testing hypotheses based on such samples. The probability density function for the sum of N independent variables, each having a Gamma density function with parameter α is known to be a Gamma distribution with parameter $N\alpha$. This, however, is not the case if each of the variables has a truncated Gamma density function. A derivation was therefore made of the density and distribution functions of the sum of N independent variables, each having a truncated Gamma density function, for the case where the parameter α is unity and N is any positive integer and for the cases where

N=2 or N=3 and α is any positive integer. Tabulations have been made giving critical values for the distributions as functions of selected truncation points.

Note:

Details may be obtained from:
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No patent action is contemplated by NASA.
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