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Abstracts of Articles

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Notes Due to Discrete Normal and Discrete Laplace Distributions

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Abstract

We consider the class of discrete distributions supported on the set of integers \( \{0, 1, 2, \ldots\} \) and specified properties of them, especially discrete normal and discrete Laplace distributions. A discrete version of normal distribution is characterized via the solution of Cauchy type equation on discrete domain by view of Darlington (1995). Discrete analogue of the normal distribution is characterized by maximum entropy when specified mean and variance on integer support on \( R \). Following Koehl (1997), this distribution is characterized by the difference of two these distributions. Normal power series distribution has maximum entropy when the 4th moment of normal distribution is pre-specified. The special case for \( k = 2 \) is discrete normal.

It will be shown that under such parametrization, uniformly for all sufficiently large variance and all expectations, discrete normal and their two central terms given by very simple formulas in view of the previous results. We are going to derive several properties of discrete normal distribution from inequalities obtained in the previous section. Approximating these moments for sums of two independent discrete normal distributions and noticing these distributions are nearly the case for the continuous normal distribution.

Some results and characteristics for this model related to reliability measures (mean life, residual life, mean value), Fisher information, characteristic (biased, and unbiased), cumulants properties (for normal, discrete normal and Poisson distributions), result due to statistical aspects and some numerical calculations that is also discussed here lead to another direction of this paper.

Discrete version of the Laplace distribution and properties like, quantile, quantile, probability and moments distributions, distribution properties and maximum entropy and information measures and finding analogues of properties of continuous Laplace distribution are derived.

Finding the values of \( a, b \) regarding to independent random variables \( X \) and \( Y \) related to these two discrete distributions is another central measure that is studied at the end of this paper.

*The full paper of this note is published. It will present in seminar only and it can not be published again.