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Quantitative Universal Label: How to Use It to Mark Any Randomness

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Abstract

It is possible to find a quantitative universal label (QUL) that can express quantitatively any random sequence in terms of a finite set of quantitative parameters. This label is associated with nine parameters of the generalized Gaussian distribution (GGD), describing all possible correlations (expressed in terms of symmetric products) for all amplitudes {yj} belonging to a random sequence considered. This noise label allows one to compare any randomness with another one and to calibrate these fitting parameters with respect to a possible external factor in the signature (character) space. It opens new resource in signal/noise data treatment and makes it possible to discover completely new relationships that might be hidden in random sequences. This label reflects the distribution of correlations between k stable points existing in the initial random sequence having N initial points ($k \leq N$). This distribution is free of any model assumption and can be used as a universal quantitative measure characterizing some random sequence. Different examples considered in this paper confirm the effectiveness of the QUL expressed in terms of GGD fitting parameters. © 2009 Allerton Press, Inc.

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