3D-DGI method: How to read and compare of any "noise"/random fluctuations on the base of "universal" platform?

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Abstract

In this presentation the author wants to prove that a trendless sequence (TLS) can be used as an additional source of information. This additional information can be extracted from random noise with the help of 3D-DGIs (discrete geometrical invariants) method that allows to reduce 3N random data points to 13 parameters composed from the combination of integer moments and their intercorrelations up to the fourth order inclusive. Actually, they form a "universal" 13-feature space for comparison of one random sequence with another one. Comparison of these parameters associated with different noise tracks allows to use this set of parameters for calibration and other purposes associated with "standard"/reference equipment. As an example, we considered chemical data taken from different laboratories. This "nano-noise" is associated with random fluctuations generated by available equipment. The new mathematical expressions proposed in this presentation allows to reduce information and then to find a few key parameters that enable to differentiate the given noise and compare one set of measurements expressed in the form of rectangle matrix with another one.

The ideas of information extraction in random fluctuations and search the hidden deterministic components are the logic continuation of the methods collected recently in the book

Keywords—3D-DGI method; Integer moments and their intercorrelations; Extraction of deterministic information from random fluctuations; Application to electrochemic data.

Biography:

Prof. Raoul R. Nigmatullin has completed his PhD at the age of 27 years from Kazan State university (now it is called as the Kazan Federal University).Then he won the internship for the visit in Chelsey college (Prof. A. Jonscher dielectric group, London University) for postdoctoral studies in 1982-1983 years. He received the status of the Full Professor in 1997 year after successful defence of his Doctorate thesis in 1992 year. Now he is working as the contracting professor in Kazan National Research Technical University (KNRTU-KAI) in Radio-electronics and Informative Measurements Technics department. He has published more than 200 papers in reputed journals and has been serving as an editorial board member and reviewer in the journals entering into the SCOPUs/WoS data bases.

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