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The International Symposium on Fractional Signals and Systems 2015, hosted by the Technical University of Cluj-Napoca, Romania, 1-3 October 2015.

Invited Debate Session Lecture

Better Understanding Complexities via Fractional Calculus: from Extreme Events to Taoism

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Date/Time:

Venue:

Host: Technical University of Cluj-Napoca, Romania

ABSTRACT:

This debate lecture is trying to promote the view point that, using fractional calculus based tools, we are able to understand complexities better. We start with basics on power law manifest of complexities and explain how power law is linked to fractional order dynamics in various contexts such as relaxation, autocorrelation, power spectrum, and probability density. We highlight heavy-tailedness and long range dependence in connection to extreme events. Our personal experience tells an unpleasant fact that “extreme events” are happening more and more often. What’s the governing law behind it? How we better understand the fact that extreme events are happening more and more often? Why this is linked to fractional order dynamics? These can be explained (fractionally) in this talk. Finally, the speaker will share an interesting interpretation of Taoism and the fact that, fractional calculus way of thinking was perhaps already embedded in the text of Lao Tzu’s “Tao Te Ching.”

BIOGRAPHY:



YangQuan Chen joined University of California, Merced in summer 2012 with a vision to promote the wide-spread use of low cost data-drones in precision agriculture and environmental monitoring. His unmanned aerial systems (UAS) team at UC Merced has been pursuing research excellence in innovative use of data-drones for crop, water, soil, dust, air, and fire etc. Dr. Chen received Ph.D. from Nanyang Technological University Singapore in 1998. His current areas of research interest include: applied fractional calculus in controls, signal processing and energy informatics; distributed measurement and distributed control of distributed parameter systems using mobile actuator and sensor networks; mechatronics; multi-UAV based cooperative multi-spectral “personal remote sensing”. He is an

Associate Editor for Acta Montanistica Slovaca, IFAC journals of Mechatronics and Control Engineering Practice, Fractional Calculus and Applied Analysis, ASME journal of Dynamical Systems, Measurement and Control, IEEE Transactions of Control Systems Technology, ISA Transactions, and IET Control Theory and Applications (CTA). He serves as the Topic-Editor-in-Chief in “Field Robotics” for International Journal of Advanced Robotic Systems (IJARS), a Founding Associate Editor for Unmanned Systems and a Senior Editor for International Journal of Intelligent and Robotic Systems. Dr. Chen is a member of ASPRS, AUVSI, AMA, IEEE, ASME, AIAA, and ASEE.