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Aula Riunioni al 4° piano di Via Branze 43. Ore 11:00

<https://meet.google.com/bud-vejy-qza>

A novel stochastic foundation of entropy and its applicability to hydrometeorology

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Abstract: In the framework of the books "Stochastics of Hydroclimatic Extremes" and "Stochastics as Physics", a novel stochastic foundation of entropy is introduced. Entropy is treated as a purely probabilistic concept — a rigorous quantification of uncertainty — derived entirely within probability theory and stochastic processes, without deterministic or metaphorical interpretations. It emerges naturally from the principle of maximum entropy, unifying thermodynamic origins with statistical descriptions of complex systems. This approach allows key properties in atmospheric thermodynamics to be derived deductively, without presupposing thermodynamic principles. In hydrometeorology, it supports robust inference under uncertainty (by both deduction and induction), improved stochastic simulation of extremes, and a deeper understanding of long-term variability and climate dynamics through entropy extremization constrained by conservation laws. Applications illustrate the linkage between micro-scale stochastic behaviour and macro-scale hydrometeorological responses, offering a coherent physical-stochastic paradigm for geophysical systems.

Short CV: Demetris Koutsoyiannis is Professor Emeritus of Hydrology and Analysis of Hydrosystems in the National Technical University of Athens. He has served as Dean of the School of Civil Engineering, Head of the Department of Water Resources and Environmental Engineering, and Head of the Laboratory of Hydrology and Water Resources Development. He was Editor of Hydrological Sciences Journal for 12 years (2006-18), and member of the editorial boards of Hydrology and Earth System Sciences, Journal of Hydrology, Water Resources Research, Hydrology, Sci, and Science of Climate Change. He has been awarded the International Hydrology Prize– Dooge medal (2014) by the International Association of Hydrological Sciences (IAHS), UNESCO and World Meteorological Organization (WMO), and the Henry Darcy Medal (2009) by the European Geosciences Union (EGU). His distinctions include the Lorenz Lecture of the American Geophysical Union (AGU) (San Francisco, USA, 2014) and the Union Plenary Lecture of the International Union of Geodesy and Geophysics (IUGG) (Melbourne, Australia, 2011). He has served as professor of Hydraulics at the Hellenic Army's Postgraduate School of Technical Education of Officers Engineers (Athens, 2007-10). He has been visiting academic/professor at the Imperial College (London, 1999-2000), Hydrologic Research Center (San Diego, 2005), Georgia Institute of Technology (Atlanta, 2005-06), University of Bologna (2006 & 2019) and Sapienza University of Rome (2008 & 2019).

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