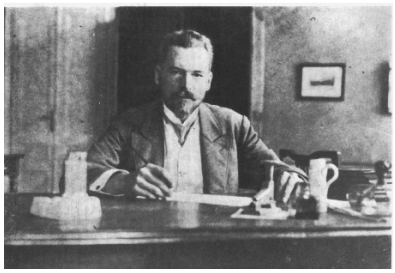

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Information and regularity of Brownian particle dynamics

Monday, 3 September 2018 12:05 (20 minutes)

The common definition of entropy is that it represents some quantifier of disorder. In classical physics, the entropy of a physical system is proportional to the quantity of energy no longer available to do physical work. In dynamical systems analysis it usually refers to the rate at which signal loses or gains information. In information theory it directly measures the information in a signal. The information can be seen as a number of possible states a system can take [1,2].

In this talk the description of the dynamics of the Brownian particle moving in the periodic potential [3] from the point of view of the information theory [2] will be address. We will discuss the role of the external forces as a source of disorder and regularities for the global dynamics and examine key time scales at which a maximum insight into the stochastic dynamics can be expected. The results of Shannon, Spectral and approximate entropies will be presented and compared.

[1] J. L. Semmlow, B. Griffe, Biosignal and Medical Image Processing 3rd Edition, 2014, CRC Press

[2] P. Gaspard, and X.J. Wang, Phys. Rep. 235, 291 (1993)

[3] L. Machura, M. Kostur, P. Talkner, J. Luczka, F. Marchesoni and P. Hänggi, Phys. Rev. E 70, 061105 (2004)

Primary author: Dr MACHURA, Lukasz (University of Silesia)

Presenter: Dr MACHURA, Lukasz (University of Silesia)

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