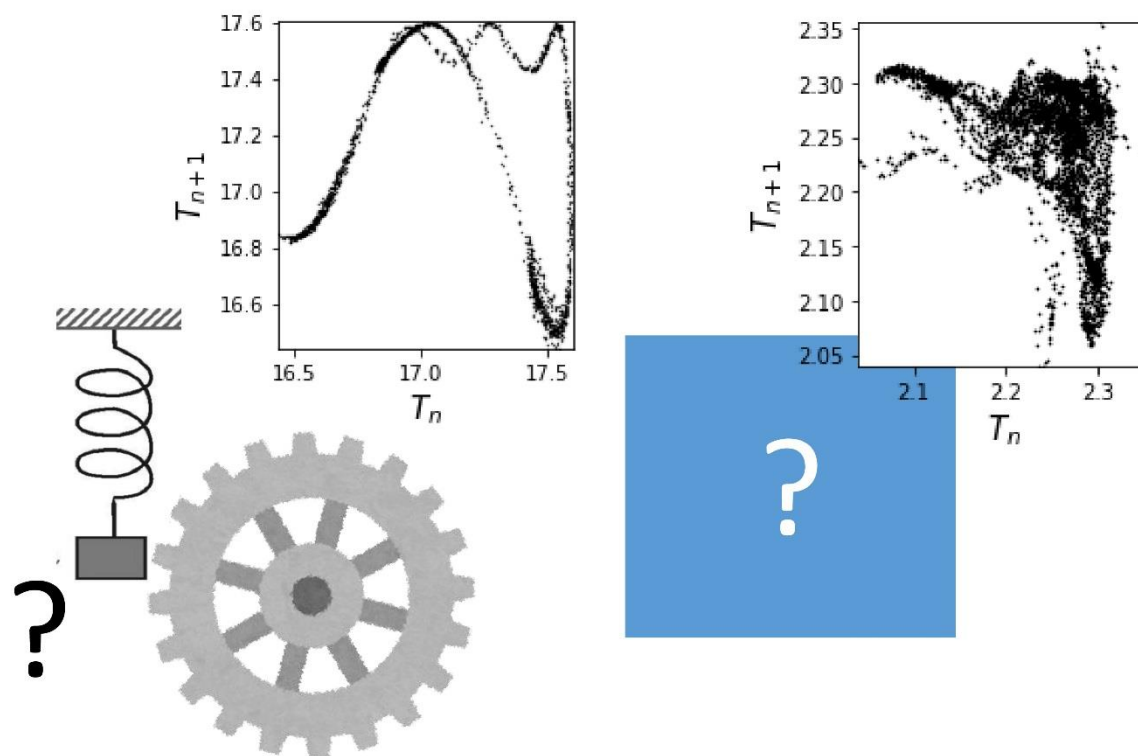


Beyond classical dripping faucet

Naoki Nishida

Max Planck Institute for the Physics of Complex Systems &
Osaka University, Japan.



Two return maps (T_n, T_{n+1}) obtained on different conditions

T_n : n th time interval between successive drops

Drops emitted from a leaky faucet exhibit various irregular patterns, which are recognized as chaotic phenomena nowadays. Though it is known that low-dimensional models like mass-spring model (Shaw, 1984) and cogwheel model (Coullet et al., 2005) reproduce the phenomenon, connection between these models and original fluid dynamics, which ideally have infinite-dimensional state space, is still unclear. In this talk, I will present a numerical evidence that conventional low-dimensional description originates from optimal energy shapes of a pendant drop. This result enables us to characterize a new chaotic regime in which the system exhibits far more complex phenomenon than in conventional chaotic regime, I will also present the latest hypothesis and numerical results on the new regime.

