ICTS | INTERNATIONAL CENTRE for THEORETICAL SCIENCES

TATA INSTITUTE OF FUNDAMENTAL RESEARCH

ICTS Statistical Physics Journal Club Seminar

Title : Martingale theory for housekeeping heat

Speaker : Shamik Gupta (Ramakrishna Mission Vivekananda University)

Date : Thursday, 19th November 2020

Time : 03:00 pm (IST)

Abstract : The housekeeping heat is the energy exchanged between a system and its environment in a nonequilibrium process that results from the violation of detailed balance. We describe fluctuations of the housekeeping heat in mesoscopic systems using the theory of martingales, a mathematical framework widely used in probability theory and finance. We show that the exponentiated housekeeping heat (in units of k_B T, with k_B the Boltzmann constant and T the temperature) of a Markovian nonequilibrium process under arbitrary time-dependent driving is a martingale process. From this result, we derive universal equalities and inequalities for the statistics of stopping times and suprema of the housekeeping heat. We test our results with numerical simulations of a system driven out of equilibrium and described by Langevin dynamics.

Online Seminar : Please click on the below link to join the seminar

https://zoom.us/j/93660487707?pwd=R3RYeWhpNmg4UzVRcURHOGVuRXdVdz09

Meeting ID: 936 6048 7707
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