

Information and control: A tale of statistical physics and engineering

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I will give in this talk an overview of works that have been done in physics on the role of information in control systems, starting with the age-old Maxwell demon, which can be seen as a feedback control system, and ending with more recent works on the information limits of control systems [1], feedback-controlled ratchets, and fluctuation relations under feedback control. The talk will focus on key concepts of statistical physics, such as entropy, efficiency, and stochastic thermodynamics, but will also emphasize the importance of knowing about control theory and control engineering when studying the physics of information and control.

[1] H. Touchette and S. Lloyd, Information-theoretic limits of control, *Phys. Rev. Lett.* 84, 1156-1159, 2000; Information-theoretic approach to the study of control systems, *Physica A* 331, 140-172, 2004.