

The Minority Game: Statistical Physics of Adaptive Cooperation of Speculative Agents in a Market

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The minority game is a simple model emulating aspects of the a system of speculative agents in a stockmarket. It poses several interesting issues as a frustrated disordered many body system, complementary to those in normal condensed matter physics but of possible relevance to other situations requiring prediction on the basis of incomplete information and learning from experience, and exhibits interesting cooperation, phase transition and non-ergodic, as well as ergodic, behaviour. Both simulations and analytic techniques developed for spin glasses, both thermodynamic and dynamic, can be employed to study, expose and understand these systems and open the door for extensions. I shall provide an overview of interesting aspects of the problem from the perspective of statistical physics and then report some recent studies of the effect of strategy correlations and timing of adaptation in minority games, which turn out to be relevant and instructive. This will involve a combination of simulations and analytic studies, especially the use of an exact generating functional approach complementing replica studies of statics.