

# Thermodynamic limit and phase transitions in non-cooperative games: some mean-field examples

Paolo Dai Pra

*Dipartimento di Matematica, Padova*

In stochastic dynamics inspired by Statistical Mechanics the interaction between different particles, or agents, is usually expressed as a given function of their states. The behavior of the system, in the limit of infinitely many particles (thermodynamic limit), may change dramatically by small changes in the parameters of the model: when this occurs we say there is a phase transition. In many applications the interaction cannot be given a priori but it is rather a result of agents' strategy, aimed at optimizing a given performance. Using the simplest models of this nature, mean field games, we illustrate some examples of phase transitions, pointing to difficulties in the proof of the thermodynamic limit.