

Generalized conditional gradient method for potential mean field games

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Mean field games (MFGs) are a class of problems modeling Nash equilibria for a very large number of small agents in evolution, interacting through coupling terms depending on their distribution. We will describe in detail an MFG model consisting of two coupled second-order PDEs, equivalent to the optimality conditions for an optimal control problem of the Fokker-Planck equation. We will investigate a numerical method, called fictitious play, in which the agents play at each iteration a “best-response”, corresponding to a predicted value of the coupling terms. We will show that this procedure is equivalent to the generalized conditional gradient method, which will allow us to establish convergence.

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