

A scholarship for PhD student in NCN grant
"The tragedy of the commons" in dynamic
context

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My fields of interest are large games (i.e. games with a continuum of players), dynamic games and optimal control theory, I'm also interested in applications of this kind of tools to economics and ecology. I can supervise PhD theses related to all those aspects of my scientific interests, both applicational and theoretical. Dynamic games are mathematical tools to model behaviour of at least two interrelated decision makers, called players, each of them aiming their own objective in an environment changing dynamically in response to their decisions, while the optimization of each player is influenced by the decisions of the rest: like in e.g. an open access marine fishery extraction problem, a commuting problem or in a pursuit-evasion problem.

1. "The tragedy of the commons" in dynamic context. The term "the tragedy of the commons" describes a situation in which many individuals use common resources, each of them pursuing their own objective, and this rationality leads to inefficiency in use of the resource. Mathematically, it is a class of games, in the ecological context, dynamic games, including differential games. "The tragedy of the commons" encompasses a variety of problems, e.g. overexploitation of fisheries, air and water pollution, spread of epidemics in presence of individual means decreasing spreading the virus, greenhouse effect or space debris.

2. Differential and multistage games: theoretical works on linear quadratic and linear logarithmic problems with constraints, with possible extensions.

3. Optimal control problems, including problems with infinite time horizon and constrained problems.

Additionally, a scholarship from NCN grant on "the tragedy of the commons" in dynamic context is available for a successful candidate.