

# Hong Kong - Singapore joint Seminar Series in Financial Mathematics/Engineering

## Stochastic Games of Productivity Expansion: Stationary Mean-Field Equilibria Professor Giorgio Ferrari Bielefeld University, Germany

### Abstract

In this talk we present recent results on stationary mean field games with singular controls in which the representative player interacts with a long-time weighted average of the population through a discounted and an ergodic performance criterion. This class of games finds natural applications in the context of optimal productivity expansion in dynamic oligopolies. We prove existence and uniqueness of the mean field equilibria, which are completely characterized through nonlinear equations. Furthermore, we relate the mean field equilibria for the discounted and the ergodic games by showing the validity of an Abelian limit. The latter allows also to approximate Nash equilibria of - so far unexplored - symmetric  $N$ -player ergodic singular control games through the mean field equilibrium of the discounted game. Numerical examples illustrate in a case study the dependency of the mean field equilibria with respect to the parameters of the games. Finally, if time allows, we will discuss a version of the model in which the profit of the representative company is affected by a macroeconomic shock playing the role of a common source of noise in the mean field game. This is based on a joint work with Jodi Dianetti and Haoyang Cao.

### About the speaker

Giorgio Ferrari is professor for Mathematical Finance at the Center for Mathematical Economics (IMW) at Bielefeld University. He obtained a Ph.D. in Mathematics for Economic-Financial Applications at the University of Rome "La Sapienza" in 2012. He then moved to IMW where he was first post-doctoral researcher (2012-2016), and then Junior-Professor (2016-2017). His research interests lie in the field of stochastic control theory and its applications to Economics and Finance. Particular attention is devoted to dynamic stochastic optimization problems and games involving singular controls and stopping rules, and to the analysis of the corresponding free-boundary problems.

### Date

8 Dec 2021 (Wednesday)  
(HK Time)

### Time

4:00pm – 5:00pm (HK  
Time)

### Zoom



<https://polyu.zoom.us/j/94244321853?pwd=Wmh5eXNkUC9KRm8rQU9Mdy9SOGhsZz09>

### Meeting ID:

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