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Registered Data

Contents [hide]

1 [CT171]

- 1.1 [00050] Generalized Game Theoretical Model with Multiple Types of Homogeneous Players
- 1.2 [00053] How predators choose their prey to maximize their utility functions by using switching prey
- 1.3 [02555] A Mean Field Game Model for Renewable Investment under Uncertainty
- 1.4 [00188] Two-Phase Modelling of Plaque Growth in Early Atherosclerosis

[CT171]

- Session Time & Room
 - CT171 (1/1) : **3D** < <https://iciam2023.org/1952#codes>> @**D514** < https://iciam2023.org/523#Venue_Information> [Chair: Abdelrahim Said Mousa]
- Classification
 - CT171 (1/1) : Game theory (**91A**) < <https://mathscinet.ams.org/mathscinet/msc>

Privacy - Terms

[00050] Generalized Game Theoretical Model with Multiple Types of Homogeneous Players

- **Session Time & Room :** 3D <
<https://iciam2023.org/1952#codes>> (Aug.23, 15:30-17:10) @D514 <
https://iciam2023.org/523#Venue_Information>
- **Type :** Industrial Contributed Talk
- **Abstract :** We introduce a decision game model with finite number of types and each type has finite number of homogeneous players. We assume that each type of player has similar characteristics and will choose only between two alternative choices or decisions). The preference for each type of players is described by a discrete utility function which gathers the influence of players in the same group and the influence of players from the other groups. We will characterize all pure "united or separated" and mixed strategies that form Nash equilibria. The united strategies ensure that all players with same type will make same decision, while separated strategy includes at least one type of players who do not make same decision. We will determine the strategic thresholds for each type that identify the Nash regions in space. As a special case, we consider three types of homogeneous players and use geometry to construct three dimensional regions for Nash equilibria, where the horizontal axis reflects the preference for players of type one, the vertical axis reflects the preference for the players of type two, and the depth axis reflects the preferences for the players of type three, and we characterize all Nash equilibria regions. Finally, we apply our model in economics "tourist sector" by introducing a resort model for three types of tourists distributed among two resorts and determine the competitive Nash Equilibrium prices for given preference for the three types of tourists.

- **Classification :** 91A06 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91A06>> , 91A10 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91A10>> , 91A35 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91A35>> , 91A43 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91A43>> , 91A11 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91A11>>
- **Format :** Talk at Waseda University
- **Author(s) :**
 - Abdelrahim Said Mousa (Birzeit University)

[00053] How predators choose their prey to maximize their utility functions by using switching prey

- **Session Time & Room :** 3D <
<https://iciam2023.org/1952#codes>> (Aug.23, 15:30-17:10) @D514 <
https://iciam2023.org/523#Venue_Information>
- **Type :** Contributed Talk
- **Abstract :** In this work, we model the relationship between prey and predators by studying the interactive behavior of this prey-predator model and using the change of prey. The objective is to maximize the profit function of each predator by seeking the strategy provided by each predator to maximize its profit. To do so, we maximize this utility function being constrained by balance equations between biomass and trophic, and we show that this last problem is completely equivalent to finding the Generalized Nash Equilibrium Point. To calculate it, we use the conditions of KKT and we show that it is indeed a Problem of Linear Complementarity.
- **Classification :** 91A06 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91A06>> , 91B06 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91B06>> , 92B05 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=92B05>> , 15A03 <

<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=15A03> > , [15A30](https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=15A30) <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=15A30> >

- **Format :** Online Talk on Zoom
- **Author(s) :**
 - **Asmaa IDMBAREK** (LAMS, Hassan II University of Casablanca, Casablanca, Morocco)
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 - **Hajar NAFIA** (LAMS, Hassan II University of Casablanca, Casablanca, Morocco)
 - **Imane AGMOUR** (LAMS, Hassan II University of Casablanca, Casablanca, Morocco)
 - **Youssef EL FOUTAYENi** (LAMS, Hassan II University of Casablanca, Casablanca, Morocco)

[02555] A Mean Field Game Model for Renewable Investment under Uncertainty

- **Session Time & Room :** [3D](https://iciam2023.org/1952#codes) <
<https://iciam2023.org/1952#codes> > (Aug.23, 15:30-17:10) @[D514](https://iciam2023.org/523#Venue_Information) <
https://iciam2023.org/523#Venue_Information >
- **Type :** Contributed Talk
- **Abstract :** We consider a stylized model for investment into renewable power plants under long-term uncertainty. Risk-averse agents face heterogeneous weather conditions and a common noise including demand trends. The objective of each agent is to maximize profit by controlling investment at discrete time steps. We prove that the N-player game admits a Nash equilibrium that converges to the unique solution of a mean field game. The numerical experiments emphasize the impact of risk aversion and heterogeneity.
- **Classification :** [91A16](https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91A16) <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91A16> > , [49N80](https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=49N80) <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=49N80> > , [91A80](https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91A80) <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91A80> > , [91A50](https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91A50) <

<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=91A50>>

- **Author(s) :**
 - Célia Escribe (Ecole Polytechnique)
 - Josselin Garnier (Ecole Polytechnique)
 - Emmanuel Gobet (Ecole Polytechnique)

[00188] Two-Phase Modelling of Plaque Growth in Early Atherosclerosis

- **Session Time & Room :** 3D <
<https://iciam2023.org/1952#codes>> (Aug.23, 15:30-17:10) @D514 <
https://iciam2023.org/523#Venue_Information>
- **Type :** Contributed Talk
- **Abstract :** We discuss the early stage of atherosclerotic plaque formation within arteries. The production of foam cells characterizes such plaque. Foam cells generate from the differentiated form of monocytes (called macrophages) owing to oxidized low-density lipoprotein (ox-LDL) cholesterol intake. Initially, plaque radius grows exponentially and later on, it stabilizes with time. Such behaviour is due to the death of foam cells owing to the toxicity of excess ox-LDL intake, although ox-LDL enhances foam cell proliferation.
- **Classification :** 92C35 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=92C35>> , 92-10 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=92-10>> , 76M20 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=76M20>> , 35B20 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=35B20>> , 92B05 <
<https://mathscinet.ams.org/mathscinet/msc/msc2020.html?s=92B05>>
- **Format :** Talk at Waseda University
- **Author(s) :**
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 - Bibaswan Dey (Department of Mathematics, University of North Bengal)

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