

Dr. Georgios I. Konstantinidis

CONTACT INFORMATION

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RESEARCH INTERESTS

Game Theory, Algorithmic Game Theory, Dynamic Systems

EDUCATION

Aristotle University of Thessaloniki, Dept. of Electrical Engineering, Greece **2012 - 2018**
Ph.D. , Game Theory and Combinatorics
Thesis: "Game-theoretical aspects of the Cops and Robber game and its variants"

University of Amsterdam, Dept. of Economics and Business, The Netherlands **2004 - 2010**
M.Sc., Econometrics
Thesis: "Wilson's ultimate outcomes in international relations: An intertemporal model of the arms race between Greece and Turkey"

National & Kapodistrian University of Athens, Dept. of Mathematics, Greece **2000 - 2002**
M.Sc., Applied Mathematics

Aristotle University of Thessaloniki, Dept. of Mathematics, Greece **1993 - 2000**
B.Sc., Mathematics

RESEARCH EXPERIENCE

PhD Researcher **2012 - 2018**
Athanasios Kehagias, Supervisor
Aristotle University of Thessaloniki, Dept. of Electrical Engineering, Thessaloniki, Greece

During my Ph.D we approached the Cops and Robber (CR) game, which is a pursue-evasion game on graphs, through a game-theoretical point of view. It is worthwhile noting that this kind of approach had no precedent in the related literature and led to original results that were published in prestigious journals in this area.[JDG 2014, TCS 2016, TCS 2017, TCS 2019]. In short, the originality and contribution of these papers consist of the following:

- We presented for the first time a formal, game-theoretical model and analysis, both of the original CR game and the variants of it which we introduced, linking this way the involved fields of Combinatorics, Graph Theory and Game Theory
- We introduced and studied interesting variants of the CR game whose study contributes to the study of central issues in the literature such as: (a) the comparison between sequential games (where players move one after the other) and their simultaneous variants (where they move simultaneously), (b) the effect of selfish motives in these games, known as "The cost of anarchy" in the related literature and (c) the study of N-player infinite games
- We gave algorithms which compute the value of the games and the optimal strategies

Postdoc Researcher **2019 - Present**
Athanasios Kehagias, Supervisor
Aristotle University of Thessaloniki, Dept. of Electrical Engineering, Thessaloniki, Greece
Title: "Subgame perfect equilibria in Selfish Cops and Active Robber game and algorithmic/game-theoretical implications".

Our cooperation with mister Kehagias goes on continuously after the end of my PhD and since June 2020 I am officially a postdoc student at the Department of Electrical Engineering. During

this period we have published two papers [TCS 2020, DGA 2021]. Our next, basic targets are the following:

- (a) A subgame perfect equilibrium (SPE) analysis of the (N-player) SCAR game, which we introduced in [TCS 2019] (versus the Nash equilibrium analysis we did in that paper and (b) the construction of an effective algorithm computing SPEa of the game
- The study of general, theoretical, game-theoretical and algorithmic implications of the previous analysis in N-player infinite games
- (a) A more extensive study of the *state cop number* notion which we introduced in [TCS 2020], (b) to establish the relation of state cop number with *cop number of a graph*, a most central notion in the CR literature, and (c) to highlight the significance of state cop number in the study of this kind of games

MSc Researcher

2008 - 2010

Roald Rammer, Supervisor

University of Amsterdam, Dept. of Economics and Business, The Netherlands

In my MSc thesis I employed Stephen Wilson’s negotiation process, which leads to a new equilibrium notion called “ultimate outcomes”, to introduce a new game-theoretical model of international relations phenomena. Subsequently I applied the model to study the arms race between Greece and Turkey. Based on the empirical work of preminent researchers, the explanatory power of the model was proved superior to that of any other model in the related literature.

PUBLICATIONS

Georgios Konstantinidis. “A game theoretic analysis of the cops and robber game.” *Journal of Dynamics and Games* vol. 1 599-619, (2014).

G. Konstantinidis, Ath. Kehagias. “Simultaneously moving cops and robbers.” *Theoretical Computer Science* vol. 645, 48-59, (2016).

Ath. Kehagias, G. Konstantinidis. “Selfish cops and passive robber: Qualitative games.” *Theoretical Computer Science* vol. 680, 25-35, (2017).

G. Konstantinidis, Ath. Kehagias. “Selfish Cops and Active Robber: Multi-Player Pursuit Evasion on Graphs.” *Theoretical Computer Science* vol. 780, 84-102, (2019).

G. Konstantinidis, Ath. Kehagias. “On positionality of trigger strategies Nash equilibria in SCAR.” *Theoretical Computer Science* vol. 845, 144-158, (2020).

Ath. Kehagias, G. Konstantinidis. “Some Game Theoretic Remarks on Two-Player Generalized Cops and Robbers Games” *Dynamic Games and Applications* vol. 11(4), 785-802, (2021).

UNIVERSITY
TEACHING
EXPERIENCE

Discrete Mathematics

Spring semester 2021-2022

Dept. of Informatics, University of West Macedonia, (external cooperator)

Linear Algebra II

Spring semester 2021-2022

Dept. of Mathematics, University of West Macedonia, (external cooperator)

Linear Algebra

Winter semester 2021-2022

Dept. of Informatics, University of West Macedonia, (external cooperator)

Fundamental Mathematical Notions

Winter semester 2021-2022

Dept. of Mathematics, University of West Macedonia, (external cooperator)

Stochastic Processes **Spring semester 2020-2021**
Dept. of Statistical and Insurance Science, University of West Macedonia, (external cooperater)

Linear Algebra **Winter semester 2020-2021**
Dept. of Statistical and Insurance Science, University of West Macedonia, (external cooperater)

Elements of Calculus and Linear Algebra **Winter semester 2020-2021**
Dept. of Agriculture, University of West Macedonia, (external cooperater)

Elements of Calculus and Linear Algebra **Winter semester 2019-2020**
Dept. of Agriculture, University of West Macedonia, (external cooperater)

(Auxiliary teaching) One variable Calculus, Many variables Calculus, Linear Algebra, Analytical Geometry, Applied Mathematics, Differential Equations **2012-2014**
Engineering School, Aristotle University of Thessaloniki, Thessaloniki

HIGHSCHOOL
TEACHING
EXPERIENCE

Highschool Mathematics **01/2020-06/2020**
2nd Day Highschool of Stavroupoli (Thessaloniki) and Day Highschool of Nea Apollonia

Highschool Mathematics **01/2019-06/2019**
5th Evening EPAL of Thessaloniki and 1st Evening EPAL of Kalamaria

Highschool Mathematics **2012-2020**
3rd Second Chance School of Thessaloniki (Diavata Prison Facility)

WORKING
EXPERIENCE

Information systems Designer and Manager **08/2003-08/2004**
NIK KIOLEIDIS AEBE, Volos

PROGRAMMING
LANGUAGES
SOFTWARE
STATISTICAL
PACKAGES

C++, Python, Matlab, Mathematica, EF Chaos, SPSS, E-Views

LINK OF THESESES
AND PUBLICATIONS

<https://www.dropbox.com/sh/1xpr8yvaayeg3y3/AAD1B46udB3aGwaCIsGgPFOMa?dl=0>