**Emel Savku, PhD**

Atılım University

Department of Computer Engineering

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**PERSONAL**

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| Date of Birth | 14.11.1985 |
| **Place of Birth** | Çankırı |

# EDUCATION

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| --- | --- |
| 2011-2017 | Middle East Technical University, **Ph.D.** |
| 2008-2010 | Ankara University, **M.Sc.** |
| 2004-2008 | Ankara University, **B.S.** |
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# ACADEMIC POSITIONS

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| --- | --- |
| 2024-Now | Assistant Professor Dr., Computer Engineering  Atılım University, Türkiye |
| 01/09/2020-10/12/2023 | Postdoctoral Research Fellow, Department of Mathematics  University of Oslo, Norway |
| 04/03/2019-31/08/2020 | Postdoctoral Research Fellow, Centre de Mathématiques Appliquées  Ecole Polytechnique, France |
| 04/06/2018-03/08/2018 | French Embassy Young Visitin Researcher, Centre de Mathématiques Appliquées, Ecole Polytechnique, France |
| 2018  (Spring semester) | Part-time Lecturer, Department of Mathematics  Bilkent Unşversity, Türkiye |
| 2017 (Autumn semester ) | Part-time Lecturer, Department of Mathematics,  Ted University |
| 2011-2017 | Research Assistant, Department of Mathematics  Middle East Technical University, Türkiye |
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**ADMINISTRATIVE DUTIES**

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### HONORS&AWARDS

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| 1 | French Embassy Young Visiting Researcher Fellowship,  04/06/2018-03/08/2018 |
| 2 | TÜBİTAK -BİDEB 2211 PhD Scholarship, 2011-2017 |
| **3** | TÜBİTAK- BİDEB 2210 MSc Scholarship, 2008-2010 |

**RESEARCH INTERESTS**

|  |  |
| --- | --- |
| 1 | Stochastic Optimal Control |
| **2** | Reinforcement Learning |
| **3** | Markov Regime-switches |
| **4** | Time-Delayed Stochastic Differential Equations |
| **5** | (Anticipated) Backward Stochastic Differential Equations |
| **6** | Stochastic Differential Games |
| **7** | Financial Mathematics |

**PUBLICATIONS**

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| --- | --- | --- |
| 1 | An Application of Stochastic Maximum Principle for a Constrained System with Memory, Submitted 2024. | |
| **2** | An Approach for Regime-switching Stochastic Control Problems with Memory and Terminal Conditions, Submitted 2024. | |
| **3** | Savku E., Memory and Anticipation: Two main theorems for Markov regime-switching stochastic processes. https://arxiv.org/abs/2302.13890. Submitted | |
| **4** | Savku E., Deep-Control of Memory via Stochastic Optimal Control and Deep Learning. In: Gayoso Mart´ınez, V., Yilmaz, F., Queiruga-Dios, A., Rasteiro, D.M., Mart´ın-Vaquero, J., Mierlu，s-Mazilu, I. (eds) Mathematical Methods for Engineering Applications. ICMASE 2023. Springer Proceedings in Mathematics & Statistics, vol 439. Springer, Cham. (2020).  DOI: <https://doi.org/10.1007/978-3-031-49218-1_16> | |
| **5** | Savku E., A Stochastic Control Approach for Constrained Stochastic Differential Games with Jumps and Regimes. Mathematics , 11, 3043, (2023).  DOI: <https://doi.org/10.3390/math11143043> | |
| **6** | Savku E., Fundamentals of Market Making via Stochastic Optimal Control, Operations Research - New Paradigms and Emerging Applications, CRC Taylor and Francis (2022).  DOI: <https://doi.org/10.1201/9781003324508-10> | |
| **7** | Savku E. and Weber G.-W., A Regime-Switching Model with Applications to Finance: Markov and Non-Markov Cases. Dynamic Economic Problems with Regime Switches, 13, Springer Nature Switzerland AG, (2020).  DOI: <https://doi.org/10.1007/978-3-030-54576-5_13> | |
| **8** | Laurelle S., Rosenbaum M. and Savku E., Assessing MiFID 2 Regulation on Tick Sizes: A Transaction Costs Analysis Viewpoint , Market Microstructure and Liquidity, Vol. 1, 2050003 (27 pages) @ World Scientific Publishing Company (2020).DOI: <https://doi.org/10.1142/S2382626620500033> | |
| **9** | Savku, E., Weber, G.-W. Stochastic differential games for optimal investment problems in a Markov regime-switching jump-diffusion market. Annals of Operations Research 312, 1171–1196 (2022).  DOI: <https://doi.org/10.1007/s10479-020-03768-5> | |
| **10** | Savku E. and Weber G.-W., A Stochastic Maximum Principle for a Markov Regime- Switching Jump-Diffusion Model with Delay and an Application to Finance , Journal of Optimization Theory and Applications, Springer, vol. 179 (2), pages 696-721, (2018).  DOI: <https://doi.org/10.1007/s10957-017-1159-3> | |
| **11** | Savku E., Azevedo N. and Weber G.-W., Optimal Control of Stochastic Hybrid Models in the Framework of Regime Switches. International Conference on Dynamics, Games and Science, DGS 2014: Modeling, Dynamics, Optimization and Bioeconomics II, Springer Proceedings in Mathematics and Statistics Series Volume 195, pp 371-387, (2017).  DOI: <https://doi.org/10.1007/978-3-319-55236-1_18> |  |

**PROJECTS**

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| --- | --- |
| 1 | A Stochastic ContROL approach to machine Learning with applications to Environmental Risk models, SCROLLER, Norwegian Research Council, Researcher, 01/09/2020-10/12/2024 |
| **2** | Analytics and Models for Regulation Statistical Modeling across Price and Time Scales: A quantitative approach to modern financial regulation, Researcher, 04/03/2019-31/08/2020 |

**CITATIONS**

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| Citation | 170 Wos |
| H-index: | 3 Wos |

**COURSES GIVEN**

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| 1 | Probability Theory |
| **2** | Calculus with Analytıcal Geometry I-II |
| **3** | Introduction to Diffrential Equations |

**CONFERENCE PRESENTATIONS**

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| --- | --- |
| 1 | E. Savku, A Nonzero-Sum Regime-Switching Stochastic Differential Game Application with Constaints, Southern Africa Mathematical Sciences Association (SAMSA) Conference, Pretoria, South Africa, November 21-24, 2023. |
| 2 | E. Savku, A Stochastic Maximum Principle Approach for a Nash Equilibrium of a Nonzero- Sum Game, IV International Conference on Mathematics and its Applications in Science and Engineering (ICMASE 2023), Madrid, Spain, July 12-14, 2023. |
| **3** | E. Savku, Stochastic Maximum Principle For A Constraint Nonzero-Sum Game Application: Bancassurance, The 10th International Workshop on Applied Probability (IWAP2023), Thessaloniki, Greece, June 7-10, 2023. |
| **4** | E. Savku, An Application of Nonzero-Sum Stochastic Differential Games in Finance, Recent Developments in Stochastics with Applications in Mathematical Physics and Finance, Hammamet, Tunisia, October 16-21, 2022. |
| **5** | E. Savku, An Application of Markov Regime-Switching Models: Bancassurance, STORM Workshop 2022, Oslo, Norway, September 5-8, 2022. |
| **6** | E. Savku, A Nonzero-Sum Game Application: Bancassurance, International Conference on Optimization and Decision Science (ODS2022), Florence, Italy, Agust 29 - September 2, 2022. |
| **7** | E. Savku, An Application of Stochastic Differential Games with Lagrange Multipliers: Bancassurance, Euro 2022, Espoo, Finland, July 3-6, 2022. |
| **8** | E. Savku, A Constrained Nonzero-Sum Stochastic Differential Game Application, 11th World Congress of the Bachelier Finance Society, Hong Kong, China, June 13-17, 2022. |
| **9** | E. Savku, An Application of Stochastic Differential Games with Lagrange Multipliers: Bancassurance, ECCO XXXV - CO 2022 Joint Conference, virtual, June 9-11, 2022 |
| **10** | E. Savku, A constrained stochastic differential game application: Bancassurance, Workshop: Stochastic Games and Martingale Optimal Transport, Milan, Italy, May 5-6, 2022. |
| **11** | E. Savku, A Nonzero-sum Game Formulation for a Markov Regime-Switching PortfolioM Strategy, SIAM Conference on Control and its Applications (CT21), joint work with G. W. Weber, Washington, USA, July 19-21, 2021. |
| **12** | E. Savku, Stochastic Maximum Principle with Regimes and Memory,EUROPT 2021 18th Workshop on Advances in Continuous Optimization, joint work with G. W. Weber, Toulouse, France, July 7-9, 2021. |
| **13** | E. Savku, Stochastic Differential Games via Dynamic Programming Principle with Regimes, 10th General AMaMeF Conference, joint work with G. W. Weber, Padua, Italy, June 22-25, 2021. |
| **14** | E. Savku, An Optimal Consumption Problem with Regimes and Memory, 9th General AMaMeF Conference, joint work with G.W. Weber, Paris, France, June 11-14, 2019. |
| **15** | E. Savku, Stochastic Differential Games of Optimal Portfolio Strategies with Regime- Switches, International Conference Dynamic, Games and Science, CIRM, joint work with G. W. Weber, Marseille, France, 3-7 June 2019. |
| **16** | E. Savku, An Optimal Consumption Problem For a Stochastic Hybrid Model with Delay, SIAM Conference on Control and its Applications (CT17), joint work with G. W. Weber, Pittsburgh, Pennsylvania, USA, July 10-12, 2017. |
| **17** | E. Savku, Kısmi Bilgi Altında Rejim De˘gi，simine Sahip Sı，crama-Dif¨uzyon Modeli için Stokastik Maksimum Prensibi ve Finansa Bir Uygulaması, 29. Ulusal Matematik Sempozyumu, joint work with G. W. Weber, Mersin, Türkiye, August 28-31, 2016. |
| **18** | E. Savku, Stokastik Hibrit Sistemlerde Optimum Kontrol ve Finansal Uygulamaları, 11. Ankara Matematik G¨unleri, joint work with G. W. Weber, Ankara, Türkiye, May 26-27, 2016. |
| **19** | E. Savku, Optimal Control of Delayed Jump-Diffusions with Regimes and An Application to Finance, 57th EURO Working Group for Commodities and Financial Modeling, University of Coimbra, joint work with G. W. Weber, Portugal, May 12-14, 2016. |
| **20** | E. Savku, Optimal Control of Stochastic Hybrid Models with An Application to Finance, 27th European Conference on Operational Research, joint work with G. W. Weber, Glasgow, UK, July 12-15, 2015. |