

# Kagan Gokbayrak

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## Education

1997–2001	Ph.D. in Manufacturing Engineering, Boston University, Boston, MA, USA. Dissertation: New Optimization Methods for Complex Systems Advisor: Christos G. Cassandras
1995–1997	M.S. in Electrical and Computer Engineering, University of Massachusetts, Amherst, MA, USA.
1990-1995	B.S. in Electrical Engineering, Bogazici University, Istanbul, TURKEY.
1990-1995	B.S. in Mathematics, Bogazici University, Istanbul, TURKEY.

## Employment

2019–2020	Professor, Industrial Engineering, Hacettepe University, Ankara, TURKEY.
2003–2019	Assistant Professor, Industrial Engineering, Bilkent University, Ankara, TURKEY.
2012–2013	Visiting Scholar, Sociotechnical Systems Research Center, Massachusetts Institute of Technology, Cambridge, MA, USA.
2013–2013	Adjunct Professor, Division of Systems Engineering, Boston University, Boston, MA, USA.
2001–2003	Network Planning Engineer, Genuity, Inc., Burlington, MA, USA.

## Research Interests

- Analysis and Control of Discrete Event and Hybrid Systems
- Design and Operation of Wireless Mesh Networks
- Distribution Network Planning
- Inventory Control under Partial Information
- Data Science and Machine Learning

# Publications

## Articles in Journals

- A1–2020 Kagan Gokbayrak and Harun Avci. A voltage drop limited decentralized electric power distribution network. *Computers and Operations Research*, 2020
- A2–2020 Harun Avci, Kagan Gokbayrak, and Emre Nadar. Structural results for average-cost inventory models with Markov-modulated demand and partial information. *Production and Operations Management*, 29:1:156–173, 2020
- A3–2018 Kagan Gokbayrak. Robust gateway placement in wireless mesh networks. *Computers & Operations Research*, 97:84–95, 2018
- A4–2017 Kagan Gokbayrak and Ayse Selin Kocaman. A distance-limited continuous location-allocation problem for spatial planning of decentralized systems. *Computers & Operations Research*, 88:15–29, 2017
- A5–2017 Kagan Gokbayrak and Emre Alper Yildirim. Exact and heuristic approaches based on noninterfering transmissions for joint gateway selection, time slot allocation, routing and power control for wireless mesh networks. *Computers & Operations Research*, 81:102–118, 2017
- A6–2013 Kagan Gokbayrak and Emre Alper Yildirim. Joint gateway selection, transmission slot assignment, routing and power control for wireless mesh networks. *Computers and Operations Research*, 40(7):1671–1679, 2013
- A7–2011 Kagan Gokbayrak. Receding horizon control of mixed line flow shop systems. *Discrete Event Dynamic Systems: Theory and Applications*, 21(1):1–10, 2011
- A8–2011 Kagan Gokbayrak. State-dependent control of a single stage hybrid system with Poisson arrivals. *Discrete Event Dynamic Systems: Theory and Applications*, 21(4):577–592, 2011
- A9–2010 Kagan Gokbayrak and Omer Selvi. Service time optimization of mixed line flow shop systems. *IEEE Transactions on Automatic Control*, 55(2):395–404, 2010
- A10–2010 Omer Selvi and Kagan Gokbayrak. A search method for optimal control of a flow shop system of traditional machines. *European Journal of Operational Research*, 205(2):325–331, September 2010
- A11–2009 Kagan Gokbayrak and Omer Selvi. A subgradient descent algorithm for optimization of initially controllable flow shop systems. *Discrete Event Dynamic Systems: Theory and Applications*, 19(2):267–282, 2009
- A12–2008 Kagan Gokbayrak and Omer Selvi. Optimization of a flow shop system of initially controllable machines. *IEEE Transactions on Automatic Control*, 53(11):2665–2668, 2008
- A13–2007 Kagan Gokbayrak and Omer Selvi. Constrained optimal hybrid control of a flow shop system. *IEEE Transactions on Automatic Control*, 52(12):2270–2281, 2007
- A14–2002 Kagan Gokbayrak and Christos G. Cassandras. Adaptive call admission control in circuit-switched networks. *IEEE Transactions on Automatic Control*, 47(6):1004–1015, 2002
- A15–2002 Kagan Gokbayrak and Christos G. Cassandras. Generalized surrogate problem methodology for online stochastic discrete optimization. *Journal of Optimization Theory and Applications*, 114(1):97–132, 2002
- A16–2001 Kagan Gokbayrak and Christos G. Cassandras. Online surrogate problem methodology for stochastic discrete resource allocation problems. *Journal of Optimization Theory and Applications*, 108(2):349–376, 2001

## Book Chapters

- B1–2002 Christos G. Cassandras and Kagan Gokbayrak. *Modeling, Control, and Optimization of Complex Systems*, chapter Optimal Control for Discrete Event and Hybrid Systems, pages 285–304. Kluwer Academic Pub., 2002
- B2–2000 Kagan Gokbayrak and Christos G. Cassandras. *Hybrid Systems: Computation and Control*, chapter Hybrid Controllers for Hierarchically Decomposed Systems, pages 117–129. Springer, 2000

## Refereed Conference Proceedings

- C1–2014 Xinmiao Sun, Christos G Cassandras, and Kagan Gokbayrak. Escaping local optima in a class of multi-agent distributed optimization problems: A boosting function approach. In *Proceedings of the 53rd IEEE Conference on Decision and Control*, pages 3701–3706. IEEE, 2014
- C2–2012 Onur Uzumlar, Kagan Gokbayrak, and Emre Alper Yildirim. Joint routing, gateway selection, scheduling and power management optimization in wireless mesh networks. In *Proceedings of the Industrial and Systems Engineering Research Conference*. IIE, 2012
- C3–2006 Kagan Gokbayrak and Omer Selvi. Optimal hybrid control of a two-stage manufacturing system. In *Proceedings of the 2006 American Control Conference*, pages 3364–3369. IEEE, 2006
- C4–2005 Kagan Gokbayrak and Omer Selvi. Optimal control of a two-stage stochastic hybrid manufacturing system with Poisson arrivals and exponential service times. In *Proceedings of the 44th IEEE Conference on Decision and Control*, pages 6940–6945. IEEE, 2005
- C5–2005 Kagan Gokbayrak and Muzaffer Misirci. Optimal control of single-stage hybrid systems with Poisson arrivals and deterministic service times. In *Proceedings of the 2005 IEEE International Symposium on Intelligent Control and 2005 Mediterranean Conference on Control and Automation*, pages 1309–1314. IEEE, 2005
- C6–2001 Christos G Cassandras, Kagan Gokbayrak, David A Castanon, Jerry M Wohletz, Michael L Curry, and Michael Gates. Modeling and agile control for joint air operation environment. In *Aerospace/Defense Sensing, Simulation, and Controls*, pages 330–341. International Society for Optics and Photonics, 2001
- C7–2000 Kagan Gokbayrak and Christos G Cassandras. A hierarchical decomposition method for optimal control of hybrid systems. In *Proceedings of the 39th IEEE Conference on Decision and Control, 2000.*, volume 2, pages 1816–1821. IEEE, 2000
- C8–2000 Kagan Gokbayrak and Christos G Cassandras. Constrained optimal control for multistage hybrid manufacturing system models. In *Proceedings of 8th IEEE Mediterranean Conference on Control and Automation*. IEEE, 2000
- C9–1999 Kagan Gokbayrak and CG Cassandras. Stochastic optimal control of a hybrid manufacturing system model. In *Proceedings of the 38th IEEE Conference on Decision and Control, 1999.*, volume 1, pages 919–924. IEEE, 1999
- C10–1999 Christos G Cassandras, Qinjia Liu, Kagan Gokbayrak, and David L Pepyne. Optimal control of a two-stage hybrid manufacturing system model. In *Proceedings of the 38th IEEE Conference on Decision and Control, 1999*, volume 1, pages 450–455. IEEE, 1999
- C11–1999 Kagan Gokbayrak and CG Cassandras. Stochastic discrete optimization using a surrogate problem methodology. In *Proceedings of the 38th IEEE Conference on Decision and Control, 1999*, volume 2, pages 1779–1784. IEEE, 1999

C12-1999 | Christos G Cassandras and Kagan Gokbayrak. Modeling and simulation-based solutions for complex resource allocation problems. In *AeroSense'99*, pages 160-170. International Society for Optics and Photonics, 1999

## Articles in Preparation

- Suheyl Gulecyuz, Kagan Gokbayrak and Emre Nadar. Inventory Management under Markov-Modulated Demand and Limited Information, in preparation.
- Kagan Gokbayrak. A Two-level Distribution Problem on the Continuous Space with Multiple Tree-star Networks. *Computers and Operations Research*, revised in March 2019.
- Harun Avci, Kagan Gokbayrak and Emre Nadar. Structural Results for Average-Cost Inventory Models with Markov-Modulated Demand and Partial Information. *Production and Operations Management*, revised in March 2019.
- Kagan Gokbayrak and Harun Avci. A Voltage Drop Limited Decentralized Electric Power Distribution Network. *Computers and Operations Research*, submitted in January 2019.

## Courses Taught

### Graduate Level

- IE 522: Queueing Systems (Bilkent University)
- SE/ME 714: Advanced Stochastic Modeling and Simulation (Boston University)

### Undergraduate Level

- IE 324: Simulation (Bilkent University)
- IE 325: Stochastic Models (Bilkent University)
- IE 342: Engineering Economic Analysis (Bilkent University)
- IE 421: Introduction to Stochastic Processes (Bilkent University)
- IE 477: Production Systems Design-Synthesis (Bilkent University)
- IE 478: Production Systems Design-Practice (Bilkent University)
- IE 496: Seminar in Production Systems (Bilkent University)

## Theses Directed

- Harun Avci, M.S, Optimal structural results for average-cost inventory systems with partially observed Markov-modulated demand, 2018.
- Suheyl Gulecyuz, M.S., Perturbation analysis methods for inventory systems with partially-observed Markov-modulated demand, 2018.
- Emirhan Bugday, M.S., A two-level network design problem with decentralized and centralized intermediate facilities, 2017.

- Gorkem Ozdemir, M.S., Solution methods for planning problems in wireless mesh networks, Bilkent University, 2012.
- Onur Uzunlar, M.S., Joint routing, gateway selection, scheduling, and power management optimization in wireless mesh networks, Bilkent University, 2011.
- Erdinc Mert, M.S., Finite perturbation analysis methods for optimization of periodic (s,S) inventory control systems, Bilkent University, 2008.
- Omer Selvi, Ph.D., Service time optimization of flow shop systems, Bilkent University, 2008.

## Funded Research Projects

- 2015–2017, Principle Investigator, Hidden Markov model and perturbation analysis applications in inventory control, Turkish Scientific and Technical Research Foundation, Budget: 204,750 TL.
- 2014–2014, Principle Investigator, Control of raw material and semi-finished product inventories in furniture production, Tepe Home, Budget: 35,990 TL.
- 2010–2012, Principle Investigator, Multi-objective optimization based solution methods for planning and operational problems of wireless mesh networks, Turkish Scientific and Technical Research Foundation, Budget: 111,840 TL.
- 2007–2008, Researcher, Traffic planning within factory, TOFAS, Budget: 26,500 TL.

## Awards

- Associate Professor, Higher Education Council of Turkey, 2010.
- Best application project, Traffic planning in TOFAS factory, Turkish Operations Research Association, 2009.
- Outstanding teaching assistant, Department of Electrical and Computer Engineering, University of Massachusetts at Amherst, 1996.
- Fellowship, Graduate School of Engineering, University of Massachusetts at Amherst, 1995.
- Second place in one million students in the university entrance exam, 1990.

## Other Professional Activities

- 2004–2016, Conference Editorial Board Member, IEEE Control Systems Society.
- Referee for
  - ACM Transactions on Modeling and Computer Simulation
  - Automatica
  - Computers and Industrial Engineering
  - Computers and Operations Research
  - Discrete Event Dynamic Systems
  - European Journal of Operational Research
  - IEEE Access

- IEEE Transactions on Automatic Control
- IEEE Transactions on Automation Science and Engineering
- IEEE Transactions on Control Systems Technology
- IISE Transactions
- International Journal of System Science
- Journal of Scheduling

## **Computing Skills**

- Programming Languages: Python, Matlab, Visual Basic for Applications, Java, C/C++, Pascal
- Software Packages: Matlab, R, CPLEX, Gurobi, Arena
- Operating Systems: MS Windows, macOS, Linux