

## CURRICULUM VITAE

**Nail Akar, Ph.D.**

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### EDUCATION

- 1989-1994, **Ph.D. in Electrical and Electronics Engineering**, Bilkent University, Ankara, Turkey, Thesis Title: Performance Analysis of an Asynchronous Transfer Mode Multiplexer with Markov Modulated Inputs
- 1987-1989, **M.S. in Electrical and Electronics Engineering**, Bilkent University, Ankara, Turkey Thesis Title: Exact and approximate decoupling and noninteracting control problems
- 1983-1987, **B.S. in Electrical and Electronics Engineering**, Middle East Technical University, Ankara, Turkey

### WORK EXPERIENCE

- **Associate Dean of the Engineering Faculty at Bilkent University from September 2019 to present.**
- Professor of the Department of Electrical and Electronics Engineering at Bilkent University from September 2014 to present.
- Associate Professor of the Department of Electrical and Electronics Engineering at Bilkent University from December 2005 to 2014.
- Assistant Professor of the Department of Electrical and Electronics Engineering at Bilkent University from July 2000 to 2005.
- Fulbright Visiting Research Scholar, School of Computing and Engineering, Department of Computer Science and Electrical Engineering, University of Missouri – Kansas City, Jan. 2010 – July 2010 (on leave from Bilkent University).
- Senior Member of Technical Staff at *Technology Planning and Integration, Long Distance Division, Sprint, Overland Park, KS*, from November 1998 to July 2000.
- Member of Technical Staff at *Technology Planning and Integration, Long Distance Division, Sprint, Overland Park, KS*, from December 1996 to November 1998.
- Visiting Assistant Professor at *Computer Science Telecommunications, University of Missouri-Kansas City* from August 1996 to December 1996.
- Visiting Scholar at *Computer Science Telecommunications, University of Missouri-Kansas City* from September 1994 to August 1996.
- Instructor and teaching assistant at *Bilkent University, Ankara, Turkey* from September 1993 to August 1994.
- Research and teaching assistant at *Bilkent University, Ankara, Turkey* from September 1987 to September 1993.

### TAUGHT COURSES

- EEE212 Microprocessors
- EEE533 Random Processes
- EEE536 Internet Architecture and Protocols
- EEE538 Communication Network Analysis

- MATH250 Introduction to Probability
- EEE431 Telecommunications I

### CURRENT RESEARCH INTERESTS

- Age of Information
- Statistical Learning
- Learning Algorithms for Feedback Control
- Reinforcement Learning
- Networked Control Systems

### PROFESSIONAL ACTIVITIES

- Area editor for Elsevier Computer Networks (2005-2008)
- Technical program co-chair, IP Operations and Management Conference (IPOM) 2008,
- Secretary and Treasurer, IEEE Turkey Section (2004–2005) and Member, IEEE.

### AWARDS AND RESEARCH GRANTS/PROJECTS

- Tübitak EEEAG Project No: 11E360 Use of Continuous Feedback Markov Fluid Queues for Performance Modeling of Computer and Communication Systems, **Principal Investigator**, 2016-2018.
- Tübitak EEEAG Project No:111E106, Analytical Modeling and Engineering of Link Layer Networks with Losses and Latency, **Principal Investigator**, 2011-2013.
- Tübitak EEEAG Project No: 106E046, Performance Analysis Techniques and Applications to Telecommunication Networks), **Principal Investigator**, July 2006-June. 2009.
- COST 279: Analysis and Design of Advanced Multiservice Networks supporting Mobility, Multimedia, and Internetworking,” sponsor: Tubitak EEEAG-101E048 and COST–European Co-operation in the field of Scientific and Technical Research, **Principal Investigator**, August 2002–June 2005.
- System-Theoretic Approach to Teletraffic Analysis and Engineering,” sponsor: Tubitak - EEEAG-101E025 and National Science Foundaton (NSF), US-Turkey Cooperative Research, **Co-Principal Investigator**, August 2001–August 2005.
- Researcher in
  - “BONE - Building the Future Optical Network in Europe”, Researcher, Sponsor: 7th European Community Framework Programme for Research and Technological Development (FP6).
  - “E-Photon/ONe (Optical Networks): Towards Bandwidth Manageability and Cost Efficiency,” Researcher, Sponsor: 6th European Community Framework Programme for Research and Technological Development(FP6), February 2004–February 2006, Budget: EUR 2,900,000 (whole consortium), EUR 54,000 (Bilkent).
  - “NEWCOM: Network Of Excellence in Wireless Communications,” Researcher, Sponsor: 6th European Community Framework Programme for Research and Technological Development (FP6), March 2004–September 2006, Budget: EUR 8,000,000 (whole consortium), EUR 150,000 (Bilkent)
  - “Digital PMR Systems”, Researcher, Sponsor: Aselsan, October 2002 - December 2002.
- Sprint values excellence, June 1998 and Sprint Quest for excellence, November 1997.

- “Teletraffic modeling and analysis of communication networks with parallelizable algorithms and their implementation” awarded the National Science Foundation Postdoctoral Research Associate Fellowship in Computational Science and Engineering Program (ASC 9625748), Principal investigator: K. Sohraby, 1996-1998.
- Bilkent University Distinguished Teaching Award 2017

## PUBLICATIONS

### EDITED BOOKS

- Jose Brazio, Phuoc Tran-Gia, Nail Akar, Andrzej Beben, Wojciech Burakowski, Markus Fiedler, Ezhan Karasan, Michael Menth, Philippe Olivier, Kurt Tutschku, Sabine Wittevrongel, COST-279 Final Report - Analysis and Design of Advanced Multiservice Networks Supporting Mobility, Multimedia, and Internetworking, Springer, 2005.
- Nail Akar, Michal Pioro, Charalabos Skianis (Eds.), LNCS 5275, 8<sup>th</sup> IEEE International Workshop, IPOM 2008, Samos Island, Greece, September 2008 Proceedings.

### BOOK CHAPTERS

- E. Ayanoglu and N. Akar, BISDN (Broadband Integrated Services Digital Network), Wiley Encyclopedia of Telecommunications, 2003.

### JOURNAL PUBLICATIONS

1. Ege Orkun Gamgam and Nail Akar, “Exact Analytical Model of Age of Information in Multi-source Status Update Systems with Per-Source Queueing”, to appear in IEEE Internet of Things Journal, 2022.
2. Ozancan Doğan and Nail Akar, "The Multi-Source Probabilistically Preemptive M/PH/1/1 Queue With Packet Errors", Communications IEEE Transactions on, vol. 69, no. 11, pp. 7297-7308, 2021.
3. Abdul Kerim Aydin and Nail Akar, "Energy Management for Age of Information Control in Solar-powered IoT End Devices", Wireless Networks, 27, 3165–3178 (2021). <https://doi.org/10.1007/s11276-021-02637-8>
4. Eray Erturk, Ozlem Yildiz, Shahram Shahsavari, and Nail Akar, “Power Allocation and Temporal Fair User Group Scheduling for Downlink NOMA”, Telecommunication Systems, 77, 753–766 (2021).
5. Omer Gursoy, Kamal Adli Mehr, Nail Akar, “ Steady-state and first passage time distributions for waiting times in the MAP/M/s+G queueing model with generally distributed patience times”, Journal of Industrial & Management Optimization, doi: 10.3934/jimo.2021078, 2021.
6. N. Akar and O. Dogan, "Discrete-Time Queueing Model of Age of Information With Multiple Information Sources," in *IEEE Internet of Things Journal*, vol. 8, no. 19, pp. 14531-14542, 1 Oct.1, 2021, doi: 10.1109/JIOT.2021.3053768.
7. Akar, N., Gursoy, O., Horvath, G., Telek, M., “Transient and First Passage Time Distributions of First- and Second-order Multi-regime Markov Fluid Queues via ME-fication”, Methodology and Computing in Applied Probability (Springer) <https://doi.org/10.1007/s11009-020-09812-y> (2020).
8. N. Akar, O. Dogan and E. U. Atay, “Finding the Exact Distribution of (Peak) Age of Information for Queues of PH/PH/1/1 and M/PH/1/2 Type”, in IEEE Transactions on Communications, vol. 68, no. 9, pp. 5661-5672, Sept. 2020, doi: 10.1109/TCOMM.2020.3002994.
9. E. O. Gamgam, C. Tunc, N. Akar, “On the Queuing Model of the Energy-Delay Trade-off in Wireless Links with Power Control and Link Adaptation”, in IEEE Transactions on Communications, vol. 67, no. 5, pp. 3431-3442, May 2019, doi: 10.1109/TCOMM.2019.2897700.

10. K. A. Mehr, J. M. Niya, N. Akar, "Queue Management for Two-User Cognitive Radio with Delay-Constrained Primary User", *Computer Networks*, vol. 142, pp. 1-12, 2018.
11. S. Shahsavari, N. Akar, B. H. Khalaj, "Joint Cell Muting and User Scheduling in Multi-Cell Networks with Temporal Fairness", *Wireless Communications and Mobile Computing*, vol. 2018, Article ID 4846291
12. M. A. Yazici, N. Akar, "Performance Modeling of QoS Differentiation in Optical Packet Switching via FDL Access Limitation", *Photonic Network Communications*, Volume 34, Issue 3, pp 344–355, Dec. 2017.
13. C. Tunc, N. Akar, "Markov Fluid Queue Model of an Energy Harvesting IoT Device with Adaptive Sensing", *Performance Evaluation*, Volume 111, Issue C, pp. 1-16, May 2017.
14. N. Akar, C. Tunc, M. Gaertner, M. F. Erden, "Disk scheduling with shortest cumulative access time first algorithms," *Turk J Elec Eng & Comp Sci*, 25: 3367 – 3380, 2017.
15. A. Yazici and N. Akar, "The Finite/Infinite Horizon Ruin Problem with Multi-threshold Premiums: A Markov Fluid Queue Approach," *Annals of Operations Research*, Vol. 252, Issue 1, pp. 85-99, May 2017.
16. C. Tunc and N. Akar, "Fixed-point Analysis of a Network of Routers with Persistent TCP/UDP Flows and Class-based Weighted Fair Queuing", *Telecommunication Systems*, Volume 64, Issue 4, pp. 585-598, April 2017.
17. O. Ozturk and N. Akar, "A novel queue-aware wireless link adaptation mechanism and its fixed-point analytical model," *EURASIP Journal on Wireless Communications and Networking* 2015, 2015:248
18. K. Vaezi and N. Akar, "Analytical performance modeling of elastic optical links with aligned spectrum allocation," *Computer Networks*, Vol. 88, pp. 40–50, September 2015.
19. S. Shahsavari and N. Akar, "A Two-Level Temporal Fair Scheduler for Multi-cell Wireless Networks," *IEEE Wireless Comm Letters*, vol.4, no.3, pp.269-272, June 2015.
20. N. Akar, "Fitting Matrix Geometric Distributions by Model Reduction," *Stochastic Models*, Vol. 31, Iss. 2, 2015.
21. C. Tunc, N. Akar, "Mapping Time-Varying IP Traffic to Flexible Optical Paths in Flex-grid Optical Networks", *Photonic Network Communications*, vol. 29, no. 1, pp: 67-77, 2015.
22. R. Yumer, N. Akar, E. Karasan, "Class-based first-fit spectrum allocation with fragmentation avoidance for dynamic flexgrid optical networks", *Optical Switching and Networking*, vol. 15, pp. 44-52, January 2015.  
URL: <http://www.sciencedirect.com/science/article/pii/S1573427714000678>
23. O. Öztürk and N. Akar, "Workload-dependent queuing model of an AQM-controlled wireless router with TCP traffic and its application to PER-based link adaptation", *EURASIP Journal on Wireless Communications and Networking*, 2014-67, 2014.
24. A. Yazıcı and N. Akar, "Running Multiple Instances of the Distributed Coordination Function for Air-time Fairness in Multi-Rate WLANs", *IEEE Trans. Communications*, accepted for publication.
25. N. Akar and Y. Gunalay, "Dimensioning Shared-per-Node Recirculating Fiber Delay Line Buffers in an Optical Packet Switch", *Performance Evaluation*, Volume 70, Issue 12, pp. 1059-1071, December 2013.
26. A. Yazıcı and N. Akar, "The Workload-dependent MAP/PH/1 Queue with Infinite/Finite Workload Capacity", *Performance Evaluation*, Volume 70, Issue 12, pp. 1047-1058, December 2013 .
27. N. Akar, "Delay Analysis of Timer-Based Frame Coalescing in Energy Efficient Ethernet", *IEEE Communications Letters*, vol. 17, no. 7, pp. 1459-1462, July 2013.
28. N. Akar, C. Raffaelli, M. Savi, "State Aggregation-based Model of Asynchronous Multi-Fiber Optical Switching with Shared Wavelength Converters", *Optical Switching and Networking*, vol. 10, no. 3, pp. 173-185, 2013.
29. N. Akar, "Moments of Conditional Sojourn Times in Finite Capacity M/M/1/N-PS Processor Sharing Queues," *IEEE Communications Letters*, vol. 16, No. 4, pp. 533-535, 2012.
30. N. Akar and K. Sohraby, "Retrial Queuing Models of Multi-wavelength FDL Feedback Optical Buffers," *IEEE Trans. Communications*, vol. 59, no. 10, pp. 2832-2840, Oct. 2011.
31. N. Akar, V. Eramo, and C. Raffaelli, "Comparative Analysis of Power Consumption in Asynchronous Wavelength-Modular Optical Switching", *Optical Switching and Networking*, vol. 8, no. 3, pp. 139-148, July 2011.

32. O. Alparslan, N. Akar and E. Karasan, "TCP Flow Aware Adaptive Path Switching in Diffserv Enabled MPLS Networks," *European Transactions on Telecommunications*, vol. 22, no. 5, pp. 185-199, August 2011.
33. N. Akar and M. A. Toksoz, "MPLS Automatic Bandwidth Allocation via Adaptive Hysteresis", *Computer Networks*, vol. 55, no. 5, pp. 1181-1196, April 2011.
34. M. A. Toksoz and N. Akar, "Dynamic Threshold-based Assembly Algorithms for Optical Burst Switching Networks Subject to Burst Rate Constraints," *Photonic Network Communications*, vol. 20, no. 2, pp. 120-130, Oct. 2010.
35. N. Akar, C. Raffaelli, M. Savi, and E. Karasan, "Shared-Per-Wavelength Asynchronous Optical Packet Switching: A Comparative Analysis", *Computer Networks*, vol. 54, no. 13, pp. 2166-2181, Sep. 2010.
36. N. Akar, E. Karasan, K. G. Vlachos, M. Varvarigos, D. Careglio, M. Klinkowski, J. Solé-Pareta, "A Survey of Quality of Service Differentiation Mechanisms for Optical Burst Switching Networks", *Optical Switching and Networking*, vol. 7, no. 1, pp. 1-10, January 2010.
37. E. Kankaya, N. Akar, "Exact Analysis of Single-Wavelength Optical Buffers with Feedback Markov Fluid Queues", *IEEE/OSA Journal of Optical Communications and Networking*, vol.1, no.6, pp.530-542, November 2009.
38. N. Akar, K. Sohraby, "System-theoretical algorithmic solution to waiting times in semi-Markov queues", *Performance Evaluation*, vol. 66, no. 11, pp. 587-606, November, 2009.
39. N. Akar, E. Karasan, and C. Raffaelli, "Fixed Point Analysis of Limited Range Share Per Node Wavelength Conversion in Asynchronous Optical Packet Switching Systems", *Photonic Network Communications*, Volume 18, Number 2, pp. 255-263, October, 2009.
40. O. Ozturk, E. Karasan, and N. Akar, "Performance Evaluation of Slotted Optical Burst Switching Systems with Quality of Service Differentiation", *IEEE/OSA Journal of Lightwave Technology*, vol. 27, no. 14, pp. 2621-2633, July, 2009.
41. H. E. Kankaya and N. Akar, Exact Analysis of Offset-based Service Differentiation in Single-channel Multi-class OBS, *IEEE Communications Letters*, vol. 13, issue 2, February 2009, pages 148-150
42. H. E. Kankaya and N. Akar, Solving Multi-Regime Feedback Fluid Queues, *Stochastic Models*, vol. 24, issue. 3, 2008.
43. N. Akar and Y. Günalay, "Stochastic analysis of finite population bufferless multiplexing in optical packet/burst switching systems," *IEICE Trans Commun*, vol. 90, pp. 342-345, 2007.
44. J. Aracil, N. Akar, S. Bjornstad, M. Casoni, K. Christodoulopoulos, D. Careglio, J. Fdez-Palacios, C. Gauger, O. Gonzalez de Dios, G. Hu, E. Karasan, M. Klinkowski, D. Morato, R. Nejabati, H. Overby, C. Raffaelli, D. Simeonidou, N. Stol, G. Tosi-Belleffi and K. Vlachos, "Research in Optical Burst Switching within the e-Photon/ONe Network of Excellence", *Optical Switching and Networking*, vol. 4, no. 1, pp.1-19, Feb. 2007.
45. K. Dogan, Y. Gunalay, and N. Akar, "Comparative study of limited range wavelength conversion policies for asynchronous optical packet switching," *Journal of Optical Networking*, vol. 6, pp. 134-145, 2007.
46. N. Akar, E. Karasan, and K. Doğan, "Wavelength converter sharing in asynchronous optical packet/burst switching: An exact blocking analysis for Markovian arrivals," *IEEE J Select. Areas Commun*, vol. 14, no.12, Part Supplement, 69-80, Dec. 2006.
47. H. Boyraz and N. Akar, "Rate-controlled optical burst switching for both congestion avoidance and service differentiation", *Elsevier Optical Switching and Networking*, vol. 2, no. 4, pp. 217-229, Dec. 2005.
48. N. Akar, "Solving the ME/ME/1 queue with state-space methods and the matrix sign function", *Performance Evaluation*, Vol. 63, No. 2, pp. 131-145, Feb. 2006.
49. T. Dayar and N. Akar, "Computing moments of first passage times to a subset of states in Markov chains", *SIAM Journal on Matrix Analysis and Applications*, Vol. 27, No. 2, 2005.
50. E. Gurses, G. Bozdagi Akar, and N. Akar, "A simple and effective mechanism for stored video streaming with TCP transport and server-side adaptive frame discard", *Computer Networks*, Vol. 48

51. T. P.R. Nyirenda-Jere, V. Frost, and N. Akar, "Capacity requirements of traffic handling schemes in multi-service networks", *Computer Communications*, Vol. 28, pp. 2070-2081, 2005.
52. O. Alparslan, N. Akar and E. Karaşan, "AIMD-based online MPLS traffic engineering for TCP flows via distributed multi-path routing", *Annales Des Telecommunications (Annals of Telecommunications, Special Issue on Traffic Engineering and Routing)*, Vol. 59, No. 11-12, Nov-Dec 2004.
53. N. Akar, I. Hokelek, and E. Karaşan, "Available bit rate traffic engineering in MPLS networks with flow-based multipath routing", *IEICE Transactions Communications*, vol. E87-B, no.10, pp. 2913-2921, October 2004.
54. N. Akar and K. Sohraby, "Infinite/finite buffer Markov fluid queues: A unified analysis", *Journal of Applied Probability*, June 2004.
55. E. Karasan, O. Ekin-Karasan, N. Akar, and M. Pinar, "Mesh topology design in overlay virtual private networks", *IEE Electronics Letters*, August 2002.
56. N. Akar, N. C. Oguz, and K. Sohraby, "A novel computational method for solving finite QBD processes", *Stochastic Models*, Vol. 16, No. 2, pp. 273-312, 2000.
57. N. Akar, N. C. Oguz, and K. Sohraby, "Matrix-geometric solutions of M/G/1-type Markov chains: A unifying generalized state-space approach", *IEEE Journal on Selected Areas in Communications*, vol. 16, no. 5, pp. 626-639, 1998.
58. N. Akar, N. C. Oguz, and K. Sohraby, "TELPACK: An advanced Teletraffic Analysis Package", *IEEE Communications Magazine*, vol. 36, no. 8, pp. 84-87, 1998.
59. N. Akar and K. Sohraby, "An invariant subspace approach in M/G/1 and G/M/1 type Markov chains", *Communications, Statistics, and Stochastic Models*, 1997.
60. N. Akar and E. Arikan, "A numerically efficient method for the MAP/D/1/K queue via rational approximations, *Queueing Systems and Applications*, 1996.
61. N. Akar and E. Arikan, "Markov modulated periodic arrival process offered to an ATM multiplexer", *Performance Evaluation*, 1995.
62. A. B. Ozguler and N. Akar, "A common solution to a pair of linear matrix equations over a principal ideal domain", *Linear Algebra and Its Applications*, vol. 144, pp. 85-89, 1991.

#### REFEREED CONFERENCE PROCEEDINGS

1. Nail Akar, "Waiting Times in BMAP/BMSP/1 Queues", The Ninth International Conference on Matrix-Analytic Methods in Stochastic Models, Budapest, June 28 - 30, 2016.
2. Caglar Tunc and Nail Akar, "Performance Modeling of Delay-based Dynamic Speed Scaling", The Ninth International Conference on Matrix-Analytic Methods in Stochastic Models, Budapest, June 28 - 30, 2016.
3. Onur Öztürk and Nail Akar, "Analysis of an Adaptive Modulation and Coding scheme with HARQ for TCP traffic", Wireless Telecommunications Symposium, 2015.
4. Mehmet Akif Yazıcı and Nail Akar, "Analysis of continuous feedback Markov fluid queues and its applications to modeling Optical Burst Switching", Proceedings of the 2013 25th International Teletraffic Congress (ITC), Shanghai, China.
5. N. Akar, C. Raffaelli, and M. Savi, "Analytical Model of Asynchronous Shared-per-Wavelength Multi-fiber Optical Switch", IEEE Conference on High Performance Switching and Routing (HPSR) 2011.
6. M. Cenk Ertürk and Nail Akar, "rtPS Uplink Scheduling Algorithms for IEEE 802.16 Networks, " in the Proceedings of 8<sup>th</sup> International Symposium on Computer Networks, ISCN'08, Istanbul, 2008.
7. N. Akar, "Model-free Adaptive Hysteresis for Dynamic Bandwidth Reservation, in the Proceedings of 15th Annual Meeting of the IEEE / ACM International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS) , Istanbul, Turkey, October 24-26, 2007.

8. N. Akar, E. Karasan, G. Muretto, Carla Raffaelli, "Performance Analysis of an Optical Packet Switch Employing Full/Limited Range Share Per Node Wavelength Conversion," in the Proceedings of IEEE Globecom 2007, Washington DC, USA, November 2007.
9. N. Akar, M. Barbera, L. Budzisz, R. Ferrùs, E. Kankaya, G. Schembra, A Performance Evaluation Framework of A Rate-Controlled MPEG Video Transmission over UMTS Networks, MediaWin 2007, Aveiro, Portugal, 2007.
10. C. Raffaelli, M. Savi, N. Akar, E. Karasan, 'Packet Loss Analysis of Synchronous Buffer-less Optical Switch with Shared Limited Range Wavelength Converters, accepted for High Performance Switching and Routing Conference, New York, 2007.
11. E. Gurses, G. B. Akar, and N. Akar, "Optimal packet scheduling and rate control for video streaming", SPIE Visual Communications and Image Processing 2007, San Jose, USA, 2007.
12. N. Akar and K. Sohraby, "Solving the Single Server Semi-Markov Queue with Matrix Exponential Kernel Matrices for Interarrivals and Services", VALUETOOLS 2006, Pisa, Italy, 2006.
13. N. Akar, "A Matrix Analytical Method for the Discrete Time Lindley Equation using the Generalized Schur Decomposition", SMCTOOLS, Pisa, Italy, 2006.
14. K. Dogan and N. Akar, "A Performance Study of Limited Range Partial Wavelength Conversion for Asynchronous Optical Packet/Burst Switching", ICC 2006, Istanbul, Turkey.
15. N. Akar and H. Boyraz, "Differentiated ABR: A New Architecture for Flow Control and Service Differentiation in Optical Burst Switched Networks", Proceedings of ONDM (Optical Network Design and Modeling) Conference, Milano, Italy, February 2005.
16. N. Akar and E. Karasan, "Exact Calculation of Blocking Probabilities for Bufferless Optical Burst Switched Links with Partial Wavelength Conversion", 1st International Conference on Broadband Networks - BroadNets 2004, San Jose, USA, 2004, also available as Lecture Notes in Computer Science, vol. 3266, pp. 124-133, 2004.
17. N. Akar, I. Hokelek, M. Atik, and E. Karasan, "A Reordering-free Multipath Traffic Engineering Architecture for Diffserv-MPLS Networks", IEEE Workshop on IP Operations and Management, Kansas City, Missouri, USA, October 1-3, 2003.
18. N. Akar and K. Sohraby, "Algorithmic Solution of Finite Markov Fluid Queues", International Teletraffic Congress, Berlin, Germany, Sep. 2003
19. N. Akar and C. Sahin, "Dynamic Capacity Provisioning in Virtual Path-Based Networks Using Reinforcement Learning", International Teletraffic Congress, Berlin, Germany, Sep. 2003.
20. N. Akar and C. Sahin, "Reinforcement Learning as a Means of Aggregate QoS Provisioning, *ART-QoS 2003, Lecture Notes in Computer Science*, Springer-Verlag Heidelberg, Volume 2698, pp. 100 - 114, 2003.
21. N. Akar and C. Sahin, "Dynamic Capacity Management for Voice over Packet Networks", International Symposium on Computers and Communications, Antalya, Turkey, July 2003.
22. E. Sengul, B. Can, N. Akar, Y. Z. Ider and H. Koymen, "Capacity Analysis of a PMR System with DAB Downlink", International Symposium on Computers and Communications, Antalya, Turkey, July 2003.
23. E. Gurses, N. Akar, and G. B. Akar, "Selective Frame Discarding for Video Streaming in TCP/IP Networks", Packet Video Workshop, 2003.
24. E. Gurses, N. Akar, and G. B. Akar, "A Novel Architecture for Layered Video Streaming in TCP/IP Networks", COST276 Information and Knowledge Management for Integrated Media Communication Workshop, Bordeaux, March 31-April 1, 2003.

25. N. Akar and C. Sahin, "Reinforcement Learning as a Means of Aggregate QoS Provisioning", Workshop on Architectures for Quality of Service in the Internet (ART-QoS), 2003.
26. E. Gurses, G. B. Akar, and N. Akar, "Impact of Scalability in Video Transmission in Promotion-Capable Differentiated Services Networks", International Conference on Image Communications 2002.
27. T. P. R. Nyirenda-Jere, V. S. Frost, and N. Akar, "Traffic Handling and Network Capacity in Multi-Service Networks", IEEE GLOBECOM 2001.
28. T. P. R. Nyirenda-Jere, V. S. Frost, and N. Akar, "Impact of Traffic Handling on Internet Capacity", SPIE Information Technologies and Communications Conference, 2001.
29. L. A. DaSilva, D. W. Petr, and N. Akar, "Static Pricing and Quality of Service in Multiple Service Networks", in the proceedings of the 5th International Conference on Computer Science and Informatics, Atlantic City, NJ, vol. 1, pp. 355-358, February 27-March 3, 2000.
30. R. Rabbat, K. Y. Siu, and N. Akar, "Supporting Differentiated Services Using ATM ABR Service", in IEEE ICCCN'99 Proceedings.
31. J. Sydir, N. Taft, and N. Akar, "Supporting TCP (In)efficiently over ATM", in MASCOTS'99 Proceedings.
32. Y. Wu, K. Y. Siu, N. Akar, and J. Yiu, "New packet discard algorithms for supporting GFR-like service", in Proceedings of IEEE GLOBECOM'99.
33. L. A. DaSilva, D. W. Petr, and N. Akar, "Effects of pricing in multi-service networks with resource allocation", in Proceedings of SPIE 1998.
34. N. Akar and K. Sohraby, "Matrix-geometric algorithmic solutions for M/G/1 type Markov chains", INFORMS'97, San Diego, 1997.
35. L. A. DaSilva, D. W. Petr, and N. Akar, "Equilibrium pricing in multi-service priority-based networks", in Proceedings of IEEE GLOBECOM'97.
36. N. Akar, N. C. Oguz, and K. Sohraby, "TELPACK: An Advanced TELEtraffic Analysis Package", in Proceedings of IEEE GLOBECOM'97.
37. N. Akar and K. Sohraby, "Matrix-geometric solutions in M/G/1 type Markov chains with multiple boundaries: A generalized state-space approach", in Proceedings of International Teletraffic Congress, 1997.
38. N. Akar, N. C. Oguz, and K. Sohraby, "Finite and infinite QBD chains: A simple and unifying algorithmic approach", in Proceedings of IEEE INFOCOM'97.
39. N. Akar and K. Sohraby, "System theoretic approach to teletraffic problems: A unifying framework", in Proceedings of IEEE GLOBECOM'96.
40. N. Akar and K. Sohraby, "A new paradigm in teletraffic analysis of communication networks", in Proceedings of IEEE INFOCOM'96.
41. N. Akar and E. Arikan, "Markov Modulated Periodic Arrival Process Offered to an ATM Multiplexer", in Proceedings of IEEE GLOBECOM'1993.
42. N. Akar and E. Arikan, "Pade approximations in the analysis of the MMPP/D/1 system", in Proceedings of ITC Specialist Seminar on Teletraffic Analysis Methods for Current and Future Telecom. Networks, pp. 137-143, Nov. 1993, Bangalore, India, 1993.
43. N. Akar and A. B. Ozguler, "Exact and almost noninteracting control problems by measurement feedback", International Conference on New Trends in Comm., Contr., and Signal Proc. pp. 779-785, Bilkent University 1990, Ankara, Turkey.



44. B. Ozguler and N. Akar, "A common solution to a pair of linear matrix equations over a principal ideal domain", IFAC Workshop on System Structure and Control: State-space and Polynomial Methods, p. 37-40, 1989, Prague, Czechoslovakia.

#### INVITED TALKS

- "Feedback Markov fluid queues with applications to modelling optical burst/packet switching networks," 90 minutes tutorial given at PERFORMACE'2010, Nov. 16, 2010, Namur-Belgium.
- "Performance Modeling of Shared Wavelength Conversion Architectures for Optical Packet/Burst Switching," 60 minutes seminar, 10 May 2010, North Carolina State University, Computer Science Department, Raleigh, NC.
- "MPLS Automatic Bandwidth Allocation by Adaptive Hysteresis", 60 minutes seminar, May 27, 2010, University of Kansas, Lawrence, KS.
- "Multi-Regime Markov Fluid Queues: Formulation, Numerical Solutions, and Applications", 60 minutes seminar, April 2010, University of Missouri – Kansas City, MO.
- IP Virtual Private Networks, BİLİŞİM 2001, Istanbul, September 2001 (in Turkish)
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- L. A. DaSilva, D. W. Petr and N. Akar, Static Pricing and Traffic Management in Networks with Allocation of Resources, *Second Annual Sprint Applied Research Partners Advanced Networking (SPARTAN) Symposium*, May 19-20 1998, Lawrence, KS.
- A. Agrawal, N. Akar and K. Sohrawy, "TELPACK: A robust and efficient teletraffic package for computer and communication networks", presented at Annual Workshop on Computer Communications, Washington DC, 1996.
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#### SUPERVISED THESIS WORK

1. Egemen Kavak, Performance analysis of generic discrete-time queues and applications to telecommunications networks, MS thesis, Bilkent University, 2001.
2. İbrahim Hökelek, Multipath based traffic engineering in MPLS networks, MS thesis, Bilkent University, 2002.
3. Ongun Yücesan, Combined use of congestion control and frame discarding for Internet video streaming, MS thesis, Bilkent University, 2003.
4. Cem Şahin, Dynamic capacity adjustment for virtual-path based networks using neuro-dynamic programming, MS thesis, Bilkent University, 2003.
5. Nuri Çelik, Using reinforcement learning for dynamic link sharing problems under signaling constraints', MS thesis, Bilkent University, 2003.
6. Hakan Boyraz, Flow control and service differentiation in optical burst switching networks, MS thesis, Bilkent University, 2005.
7. Kaan Doğan, Performance study of asynchronous/synchronous optical burst/packet switching with partial wavelength conversion, MS thesis, Bilkent University, 2006.
8. Sila Kurugöl, A dynamic DRR scheduling algorithm for flow level QoS assurances for elastic traffic, MS thesis, Bilkent University, 2006.
9. Hüseyin Emre Kankaya, Feedback fluid queues with multiple thresholds, MS thesis, Bilkent University, 2006.

10. Eren Gürses, Optimal streaming of rate adaptable video", **PhD thesis**, Middle East Technical University, 2006 (co-supervised with G. B. Akar).
11. Cenk Ertürk, Uplink Scheduling Algorithms for the rtPS Traffic Class for IEEE 802.16 Networks, MS thesis, Bilkent University, 2008.
12. Emre Kankaya, Performance Evaluation of Telecommunication Networks Based on Multi-Regime Fluid Queues , **PhD thesis**, 2009.
13. Altan Toksöz, Dynamic Threshold-Based Algorithms for Communication Networks, MS Thesis, 2009.
14. Fırat Karataş, A Distributed Air-Time Fair Mac for Multi-Rate IEEE 802.11 Networks Using Multiple Distributed Coordination Functions, MS thesis, 2010.
15. Volkan Dinç, Analytical Modeling of Multi-Channel Optical Burst Switching with Multiple Classes, MS Thesis, 2011.
16. Gökhan Çalıř, M.S., "Performance Modeling of Communication Networks Offered with a Mixture of Persistent TCP and UDP Flows", July 2013.
17. Ramazan Yümer, COMPARATIVE EVALUATION OF SPECTRUM ALLOCATION POLICIES FOR DYNAMIC FLEXGRID OPTICAL NETWORKS, 2013.
18. Mehmet Akif Yazıcı, Stochastic modeling with continuous feedback Markov fluid queues", **Ph D thesis**, 2014.
19. Onur Öztürk, Performance modeling and analysis of the interplay among TCP, active queue management and wireless link adaptation, **PhD thesis**, 2015.
20. C. Tunc, Energy management in energy harvesting wireless sensor nodes with lifetime constraints, MS Thesis, 2016.
21. Ege Orkun Gamgam, Queuing analysis of the energy-delay trade-off in wireless networks, MS Thesis 2018.
22. Abdul Kerim Aydın, Adaptive energy management for solar energy harvesting wireless sensor nodes, MS Thesis, 2018.
23. Hira Noor, Load balancing enhancements to the routing protocol for low power and lossy networks in the Internet of things, MS Thesis, 2018.
24. Mahzeb Fiaz, Reservation frame slotted ALOHA for multi-class IoT networks, MS Thesis, 2019.
25. Ömer Gürsoy, Numerical methods for the transient analysis of multi-regime Markov fluid queues, MS Thesis, 2019.
26. Zafer Topçuođlu, Fair user scheduling for downlink power domain NOMA, MS Thesis, 2019.
27. Ozancan Dođan, Exact Distribution of Age of Information (AoI) and Peak AoI in Single-Source and Multi-Source Status Update Systems, MS Thesis, 2021.