

# Curriculum Vitae

Abdulrahman Kalbat

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## Contact Information

**Title:** Assistant Professor in the Electrical Engineering Department

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## EDUCATION

- Visiting Scholar in Industrial Engineering and Operations Research** Sep. 2015 – Feb. 2016  
University of California, Berkeley
- Ph.D in Electrical Engineering** Jan 2014 – Dec. 2015  
Columbia University in the City of New York  
**Advisor:** Prof. Javad Lavaei  
**Thesis:** Distributed and Large-Scale Optimization
- M.S. in Electrical Engineering** Aug. 2012 – Dec. 2013  
Columbia University in the City of New York
- B.S. in Electrical Engineering** Aug. 2006 – Jun. 2011  
United Arab Emirates University, Al Ain, Abu Dhabi. UAE

## WORK AND RESEARCH EXPERIENCE

- United Arab Emirates University, Abu Dhabi, UAE.** Feb. 2016 – present  
Assistant Professor in the Electrical Engineering Department
- United Arab Emirates University, Abu Dhabi, UAE.** Dec. 2011 – Feb. 2016  
National Teaching Assistant Program in the Electrical Engineering Department
- NASA Ames Research Center, Moffett Field, California.** Jun. 2011 – Aug. 2011  
Visiting Scientist in the Intelligent Systems Division  
**Mentor:** Scott Poll  
**Co-Mentor:** Dr. Bhaskar Saha
- Dubai Electricity and Water Authority, Dubai, UAE.** Jun. 2010 – Aug. 2010  
Summer Trainee in the Transmission Maintenance Department
- Technobothnia Technology Research Center, Vaasa, Finland.** Jan. 2010 – May 2010  
Industrial Trainee in the Electricity, Energy and Automation Technology Lab  
**Mentor:** Dr. Smail Menani

## RESEARCH AREAS

- Distributed and large-scale optimization algorithms
- Control theory
- Power systems
- Data science
- Smart grid applications

## TEACHING EXPERIENCE

### United Arab Emirates University

- **Fall 2016:** ELEC 320 - Electric Circuits II (Undergraduate course - Section 01 and Section 51)
- **Fall 2016:** ELEC 602 - Linear Systems (Graduate course - Section 01)

## PUBLICATIONS

### Submitted Journal Papers:

- [1] **Abdulrahman Kalbat** and Javad Lavaei, "A Fast Distributed Algorithm for Decomposable Semidefinite Programs," Submitted to *Mathematical Programming Computation*.

### Refereed Journal Paper:

- [1] Ramtin Madani, **Abdulrahman Kalbat**, and Javad Lavaei, "A Low-Complexity Parallelizable Numerical Algorithm for Sparse Semidefinite Programming," to appear in *IEEE Transactions on Control of Network Systems*, 2017.
- [2] Ghazal Fazelnia, Ramtin Madani, **Abdulrahman Kalbat**, and Javad Lavaei, "Convex Relaxation for Optimal Distributed Control Problems," *IEEE Transactions on Automatic Control*, vol. 62, no. 1, pp. 206–221, Jan 2017.

### Refereed Conference Papers:

- [1] Hanan Al-Tous, Imad Barhumi, **Abdulrahman Kalbat**, and Naofal Al-Dhahir, "ADMM for Joint Data and Off-Grid NBI Recovery in OFDM Systems," in *IEEE Wireless Communications and Networking Conference (WCNC)*, Barcelona, Spain, Apr. 15–18, 2018, pp. 1–6.
- [2] Hanan Al-Tous, Imad Barhumi, **Abdulrahman Kalbat**, and Naofal Al-Dhahir, "CS-PSO Algorithm for Off-Grid Narrow-Band Interference Mitigation in OFDM Systems," in *IEEE Wireless Communications and Networking Conference (WCNC)*, San Francisco, California, Mar. 19–22, 2017, pp. 1–6.
- [3] Hanan Al-Tous, Imad Barhumi, **Abdulrahman Kalbat**, and Naofal Al-Dhahir, "Joint data recovery and NBI mitigation in OFDM systems using CS framework," in *IEEE International Conference on Ubiquitous Wireless Broadband (ICUWB)*, Nanjing, China, Oct. 16–19, 2016, pp. 1–4.
- [4] **Abdulrahman Kalbat** and Javad Lavaei, "A Fast Distributed Algorithm for Decomposable Semidefinite Programs," in *54th IEEE Conference on Decision and Control*, Osaka, Japan, Dec. 15–18, 2015, pp. 1–8.
- [5] Ramtin Madani, **Abdulrahman Kalbat**, and Javad Lavaei, "ADMM for Sparse Semidefinite Programming with Applications to Optimal Power Flow Problem," in *54th IEEE Conference on Decision and Control*, Osaka, Japan, Dec. 15–18, 2015, pp. 1–8.
- [6] **Abdulrahman Kalbat**, Ramtin Madani, Ghazal Fazelnia, and Javad Lavaei, "Efficient Convex Relaxation for Stochastic Optimal Distributed Control Problem," in *52nd Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, 2014, pp. 589–596.
- [7] **Abdulrahman Kalbat**, "Linear Quadratic Gaussian (LQG) Control of Wind Turbines," in *IEEE 3rd Int. Conf. on Electric Power and Energy Conversion Systems*, Istanbul, Turkey, Oct. 2–4, 2013, pp. 1–5.

- [8] **Abdulrahman Kalbat**, “ PSCAD Simulation of Grid-Tied Photovoltaic Systems and Total Harmonic Distortion Analysis,” in *IEEE 3rd Int. Conf. on Electric Power and Energy Conversion Systems*, Istanbul, Turkey, Oct. 2–4, 2013, pp. 1–6.

## TALKS

- **IEEE Conference on Decision and Control (CDC)**, December 2015
  - Talk 1: “A Fast Distributed Algorithm for Decomposable Semidefinite Programs”
  - Talk 2: “ADMM for Sparse Semidefinite Programming with Applications to Optimal Power Flow Problem”
  - Talk 3: “Transformation of Optimal Centralized Controllers Into Near-Global Static Distributed Controllers”
  - Talk 4: “Inverse Function Theorem for Polynomial Equations using Semidefinite Programming”
- **Modeling and Optimization: Theory and Applications (MOPTA)**, July 2015
  - “A Fast Distributed Algorithm for Sparse Semidefinite Programs”
- **International Symposium on Mathematical Programming (ISMP)**, July 2015
  - “Alternating Direction Method of Multipliers for Sparse Semidefinite Programs”

## AWARDS AND HONORS

- **Selected as a member of Mohammed bin Rashid Academy of Scientists** Dec. 2017
- **UAE University award in recognition of the fast completion of my PhD studies** Aug. 2016
- **UAE Embassy and UAE University Scholarship** Dec. 2011 - Feb. 2016
- **Middle East Oil and Gas Show**, Manama, Bahrain. Sep. 2011  
1<sup>st</sup> place in case study competition
- **Int. Conf. on Sustainable Systems and Environment**, Sharjah, UAE. Mar. 2011  
3<sup>rd</sup> place in students posters competition
- **Community Service Competition in IEEE UAE Student Day**, Abu Dhabi, UAE. May 2010  
1<sup>st</sup> place

## SOFTWARE

**Sparse SDP Solver:** This solver is a high-performance C++ implementation of our fast and parallelizable iterative algorithm for solving large-scale sparse semidefinite programs. The solver is written by **Abdulrahman Kalbat** and Javad Lavaei (beta version, last updated on 12/18/2016)

## PROFESSIONAL ACTIVITIES

### Reviewer:

- IEEE Transactions on Smart Grid
- IEEE Transactions on Control Systems Technology
- IET Generation, Transmission and Distribution
- Systems Science and Control Engineering An Open Access Journal
- IEEE Conference on Decision and Control
- European Control Conference
- American Control Conference
- IEEE International Conference on Electric Power and Energy Conversion Systems

### Session Chair:

- Co-chair of the session “Computational Methods II” in IEEE Conference on Decision and Control 2015 (Osaka, Japan)
- Co-chair of the session “Optimization II” in IEEE Conference on Decision and Control 2015 (Osaka, Japan)

### **Mentoring Experience:**

- Sai Karthik Reddy Ginni, Columbia University (Master student), Spring 2015
- Saaketh Krosuri, High school student, Summer 2014

### **Leadership Experience:**

- Columbia University Renewable Energy Society (CURES), School Liaison for the EE Dept., 2013
- Young Future Energy Leaders (YFEL), member, program by MASDAR Institute of Science and Technology, 2012
- UAE NASA Research Fellows Alumni Organization, President of Brand and Image, 2011 – Present
- IEEE UAE University Student Branch, Publicity (2010), Vice Chair (2009), Technical Support (2007)

### **Professional Affiliations:**

1. Institute of Electrical and Electronics Engineers (IEEE).
  - Power and Energy Society (PES)
  - Control and Systems Society (CSS)
2. The Institute for Operations Research and the Management Sciences (INFORMS).

## **SKILLS**

**Programming Languages:** C++, C, Java, Visual Basic and Assembly language

**Linear Algebra Routines and Libraries:** LAPACK, BLAS, Armadillo and Eigen

**Parallel Programming:** OpenMP

**Mathematical Programming Tools:** CVX, MOSEK, SeDuMi, SDPT3, OpenSolver and Oracle Crystal Ball

**Tools:** LATEX, TikZ and MS Office.

**Engineering Tools:** Matlab, PSCAD (Power Systems CAD), HOMER (Hybrid Optimization Model for Electric Renewables) and BCVTB (Building Controls Virtual Test Bed)

## **PERSONAL INFORMATION**

**Year of Birth:** 1988

**Citizenship:** United Arab Emirates

**Languages:** Arabic (native), English (fluent), Finnish (basic)

**Erdős Number** = 4 (Abdulrahman Kalbat → Javad Lavaei → Stephen Boyd → Persi Diaconis → Paul Erdős)