

Curriculum Vitae

Kai Sun

Associate Professor

Department of Electrical Engineering & Computer Science
University of Tennessee, Knoxville
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RESEARCH INTERESTS

Modeling, stability, dynamics and control of interconnected power grids and other complex nonlinear systems.

EDUCATION

- Jun 2004 Ph.D. in Control Science and Engineering, Tsinghua University, Beijing, China
Dissertation: *An OBDD-based Three-phase Method for Searching for Splitting Strategies of Large-scale Power Networks against Blackouts*
Advisor: Prof. Da-Zhong Zheng
- Jun 1999 B.S. in Control Science and Engineering, Tsinghua University, Beijing, China

PROFESSIONAL EXPERIENCE

- Aug 2017-Present **Associate Professor**, University of Tennessee, Knoxville, TN, USA
- Department of Electrical Engineering & Computer Science
 - CURENT - Center for Ultra-Wide-Area Resilient Electric Energy Transmission Networks (affiliated faculty)
- Aug 2012-Jul 2017 **Assistant Professor** University of Tennessee, Knoxville, TN, USA
- Department of Electrical Engineering & Computer Science
 - CURENT - Center for Ultra-Wide-Area Resilient Electric Energy Transmission Networks (affiliated faculty)
- Aug 2012-Dec 2014 **Consulting Employee**, Electric Power Research Institute (EPRI), Knoxville, TN, USA
- Jun 2007-Jul 2012 **Project Manager**, Electric Power Research Institute (EPRI), Palo Alto, CA, USA
- Grid Operations, Planning and Renewable Integration Programs in the Power Delivery & Utilization Department
- Dec 2006-May 2007 **Research Associate**, Arizona State University, Tempe, AZ, USA
- Department of Electrical Engineering (with Prof. Vijay Vittal)
 - PSEC - Power Systems Engineering Research Center (affiliated)
- Jan 2005-Dec 2005 **Postdoctoral Fellow**, University of Western Ontario, London, ON, Canada
- Department of Electrical & Computer Engineering (with Prof. Tarlochan S. Sidhu)

AWARDS

2019	Professional Promise in Research Award by the Tickle College of Engineering, University of Tennessee - Knoxville
2017	Excellent Associate Editor , Journal of Modern Power Systems and Clean Energy.
2016	NSF CAREER Award for “Integrated Research and Education in Nonlinear Modal Decoupling and Control for Resilient Interconnected Power Systems”
2016	Professional Promise in Research Award by the College of Engineering, University of Tennessee - Knoxville
2016	Most Valuable Players Award of NASPI (North American Synchrophasor Initiative) Control Room Solution Task Team for “Development of the Online Test Cases Library on Oscillation Source Location” by U.S. Department of Energy.
2015	Best Papers Award by IEEE PES General Meeting for paper “Application of Adomian Decomposition for Multi-Machine Power System Simulation”
2014	Best Papers Award by IEEE PES General Meeting for paper “A New Approach to Optimization of Dynamic Reactive Power Sources Addressing FIDVR Issues”
2012	EPRI Performance Recognition Award “for diligence in supporting transmission efficiency projects with Con Edison by developing computational tool for optimal schedule of reactive power and voltage control”
2009	EPRI Chauncey Award, the highest annual EPRI award , for contributions in “Advanced Tools for Reliable Operation and Robust Planning”
2008	EPRI Technology Innovation Excellence Award for “establishing EPRI as a thought leader in cascading failures of power grids and creating a new project set for the ‘Grid Operation’ Program in Power Delivery and Utilization Sector”
2006	“100 Best Doctoral Dissertations of China” Award for dissertation “An OBDD-based Three-phase Method for Searching for Splitting Strategies of Large-scale Power Networks against Blackouts” by the Ministry of Education of China

GRANTS**Grants at the University of Tennessee (total: \$2.55M):**

<u>Years</u>	<u>Funder</u>	<u>Title/Description</u>	<u>PI/co-PI</u>	<u>Amount</u>
2016-2021	NSF	CAREER Award: Integrated Research and Education in Nonlinear Modal Decoupling and Control for Resilient Interconnected Power Systems (ECCS-1553863)	PI	\$500,000
2016-2019	NSF	A Semi-Analytical Framework for Faster Deterministic and Stochastic Power System Simulations (ECCS-1610025)	PI	\$303,863
2018-2020	GEIRI N.A. Inc.	PMU-Based Early Warning and Control of Power System Oscillations	PI	\$130,000
2017-2018	GEIRI N.A. Inc.	PMU-Based Voltage Stability Monitoring and Control	PI	\$70,351
2015-2016	Eleon Energy Inc.	Parallel Power System Restoration	PI	\$30,000

2015-2016	eMIT, LLC	A New Method for User-friendly Electromagnetic Transient Simulation Modeling	PI	\$46,421
2015-2019	ORNL	Implementation of Parareal in Time Power System Simulation on HPC	PI	\$229,099
2013-2016	ORNL	Optimal Dynamic VAR Management Involving Renewables against Voltage Security Issues	PI	\$172,714
2013-2014	NEC Labs	Novel Control Techniques for Enhancement of Microgrid Stability in the Islanded Mode	PI	\$60,000
2013-2014	EPRI	Under Voltage Load Shedding to Prevent Voltage Collapse	PI	\$49,183
2012-2014	DOE / EPRI	High-Performance Hybrid Simulation/ Measurement Based Tools for Proactive Operator Decision Support: Measurement-based Stability Assessment Tool (DE-OE0000628; EPRI subcontract)	PI	\$350,618
2018-2019	UT	Interdisciplinary Research Seed Grant: A Novel Hybrid Dynamical System Approach for Understanding Modern Power Systems Integrated with Power Electronics	PI	\$74,969
2012-2019	NSF	ERC: Center for Ultra-wide Area Resilient Electric Energy Transmission Network (CURENT; EEC-1041877)	Co-PI	\$534,804

Federal grants at the Electric Power Research Institute (\$0.95M):

<u>Years</u>	<u>Funder</u>	<u>Title</u>	<u>PI/co-PI</u>	<u>Amount</u>
2010-2013	DOE	Development and Demonstration of a Synchrophasor-based Voltage Stability Monitoring Tool (DE-OE0000375; under Entergy subcontract)	PI	\$214,429
2009-2012	DOE	Demonstration of a Novel Synchrophasor-based Situational Awareness System (DE-OE0000128)	PI	\$750,000

TEACHING

University of Tennessee, Knoxville

Undergraduate:

- *ECE 325 - Electric Energy System Components:* Fall 2015, Fall 2016, Fall 2018
- *ECE 421 - Electric Energy Systems:* Fall 2013, Fall 2014, Fall 2017
- *ECE 422 - Power System Operations & Planning:* Spring 2014, Spring 2015, Spring 2019

Graduate:

- *ECE 521 - Power Systems Analysis I:* Fall 2013
- *ECE 522 - Power Systems Analysis II:* Spring 2013, Spring 2014, Spring 2017, Spring 2018
- *ECE 620 - Ultra-wide-area Resilient Electrical Energy Transmission Networks:* Fall 2016, Fall 2017
- *ECE 692 - Advanced Topics on Power System Stability:* Spring 2016

Stanford University

- Guest lecturer for *EE392N - Intelligent Energy Systems*: Spring 2012

ALUMNI (MAJOR ADVISOR)**7 PhDs**

1. Denis Osipov, Ph.D. in EE, November 2018 (now with Rensselaer Polytechnic Institute)
Dissertation: *Adaptive Nonlinear Model Reduction for Fast Power System Simulation*
2. Wenyun Ju, Ph.D. in EE, August 2018 (now with Electric Power Group)
Dissertation: *Modeling, Simulation and Analysis of Cascading Outages in Power Systems*
3. Yongli Zhu, Ph.D. in EE, July 2018 (now with GEIRI N.A. Inc.)
Dissertation: *Control and Placement of Battery Energy Storage Systems for Power System Oscillation Damping*
4. Nan Duan, Ph.D. in EE, November 2017 (now with Lawrence Livermore National Laboratory)
Dissertation: *Towards Faster-than-real-time Power System Simulation Using a Semi-analytical Approach and High-performance Computing*
5. Bin Wang, Ph.D. in EE, October 2017 (now with Texas A&M University)
Dissertation: *Nonlinear Oscillation Analysis and Modal Decoupling for Power Systems*
6. Weihong Huang, Ph.D. in EE, October 2017 (now with New York ISO)
Dissertation: *Optimal Allocation of Dynamic Var Sources Addressing FIDVR Issues*
7. Fengkai Hu, Ph.D. in EE, July 2016 (now with GE Grid, USA)
Dissertation: *Real-time Voltage Stability Monitoring and Control for Load Areas: A Hybrid Approach*

2 Masters

8. Weihong Huang, M.S. in EE, December 2014
M.S. Thesis: *A New Approach to Optimization of Dynamic Reactive Power Sources Addressing FIDVR Issues*
9. Hira Amna Saleem (now with Shell, Pakistan), M.S. in EE, May 2014
M.S. Thesis: *Microgrid Modeling and Grid Interconnection Studies*

CURRENT GRADUATE STUDENTS

- | | | |
|----------------|---------------|-----------------------|
| 1. Xin Xu | Ph.D. student | Fall 2016 – Present |
| 2. Yang Liu | Ph.D. student | Spring 1017 – Present |
| 3. Tianwei Xia | Ph.D. student | Fall 2017 – Present |
| 4. Min Xiong | Ph.D. student | Fall 2019 – Present |

ADVISED POSTDOCRATES

1. Dr. Chengxi Liu, 2016 – 2018 (now Associate Professor with Aalborg University, Denmark)
2. Dr. Rui Yao, 2016 - 2018 (now with Argonne National Laboratory)
3. Dr. Junjian Qi, 2013-2015 (now Assistant Professor with University of Central Florida)
4. Dr. Miao Fan, 2013 (now with Siemens Industry, USA)

PROFESSIONAL ACTIVITIES

- 2013 - Present **IEEE Senior Member**
- 2016 - Present **Sigma Xi Member**
- 2018 - Present **Associate Editor** of *IEEE Access*
- 2018 - Present **Editor** of *IEEE Transactions on Power Systems*
- 2012 - Present **Editor** of *IEEE Transactions on Smart Grid*
- 2017 - Present **Associate Editor** of Journal of Modern Power Systems and Clean Energy since 2017
- 2016 - Present **Associate Editor** of *IET Generation, Transmission & Distribution*

PATENTS

1. Fei Wang, Leon M. Tolbert, Yiwei Ma, Kevin Tomsovic, **Kai Sun**, Shuoting Zhang, Jingxin Wang, “A versatile power electronics converter based reconfigurable grid emulation platform,” US Patent Application, No. 16/165,547, October, 2018
2. Chengxi Liu, **Kai Sun**, Bin Wang, Xin Xu, “Voltage Stability Assessment, Control and Probabilistic Power Flow Based on Multi-Dimensional Holomorphic Embedding Techniques,” US Patent Application, No. 62/697,907, July 2018.
3. Nan Duan, **Kai Sun**, “Transient Stability Simulation and Operation of Power Systems,” US Patent Application, No. 14/956,076, filed in Dec. 2015.
4. **Kai Sun**, Kyeon Hur, Pei Zhang, “Application of Phasor Measurement Units (PMU) for Controlled System Separation,” US Patent No. 8/606,422, issued in Dec. 2013 (Taiwan Patent No. I426677, Feb. 2014).
5. **Kai Sun**, Qiang Zhou, “Application of Phase-Locked Loop (PLL) in Oscillation Monitoring for Interconnected Power Systems,” US Patent No. 13/280,458, issued in April 2013.
6. Qianchuan Zhao, **Kai Sun**, Da-Zhong Zheng, Jin Ma, Qiang Lu, “Solution to Preventing Power Systems from Collapse in Case of Catastrophe,” Chinese Patent No. 03122884, issued in May 2003.

PUBLICATIONS (total: 164)

GoogleScholar: h-index: 26 i10-index: 64

(*): mentored student co-author

(#): mentored postdoctoral co-author

(*Corresponding author*): the paper of which I am the senior author leading and approving the research.

Book

1. **Kai Sun**, Yunhe Hou, Wei Sun, Junjian Qi, *Power System Control under Cascading Failures: Understanding, Mitigation and System Restoration*, Wiley-IEEE Press, 2018. ISBN: 978-1-119-28202-0.

Book Chapters

2. **Kai Sun**, “Measurement-based Voltage Stability Assessment Techniques,” *Standard Handbook for Electrical Engineers* (17th edition), McGraw-Hill, 2018. ISBN: 978-1-259-64258-6.

3. **Kai Sun**, Fengkai Hu (*), “Measurement-based Voltage Stability Monitoring for Load Areas,” *Application of Smart Grid Technologies: case studies in saving electricity in different parts of the world*, Elsevier, 2018. ISBN: 978-0-128-03128-5.
4. **Kai Sun**, “WAMS Based Controlled System Separation to Mitigate Cascading Failures in Smart Grid,” *Smart Grid Control: Opportunities and Research Challenges*, Springer, 2018. ISBN: 978-3-319-98310-3.

Published/Accepted Refereed Journal Papers (total: 70)

1. Bin Wang (*), **Kai Sun**, Xin Xu, “Nonlinear Modal Decoupling Based Power System Transient Stability Analysis,” *IEEE Transactions on Power Systems*, in press. (*Corresponding author*)
2. Chengxi Liu (#), Fengkai Hu (*), Di Shi, Xiaohu Zhang, **Kai Sun**, Zhiwei Wang, “Measurement-Based Voltage Stability Assessment Considering Generator VAR Limits,” *IEEE Transactions on Smart Grid*, in press.
3. Yang Liu (*), **Kai Sun**, Rui Yao, Bin Wang, “Power System Time Domain Simulation Using a Differential Transformation Method,” *IEEE Transactions on Power Systems*, in press. (*Corresponding author*)
4. Chengxi Liu (#), Nan Qin, **Kai Sun**, Claus Leth Bak, “Remote Voltage Control Using the Holomorphic Embedding Load Flow Method,” *IEEE Transactions on Smart Grid*, in press.
5. Jae-Kyeong Kim, Jin Ma, **Kai Sun**, Jaegul Lee, Jeonghoon Shin, Yonghak Kim, Kyeon Hur, “A Computationally Efficient Method for Bounding Impacts of Multiple Uncertain Parameters in Dynamic Load Models,” *IEEE Transactions on Power Systems*, in press
6. Amir Golshani, Wei Sun, **Kai Sun**, “Real-time Optimized Load Recovery Considering Frequency Constraints,” *IEEE Transactions on Power Systems*, in press.
7. Rui Yao (#), **Kai Sun**, Feng Qiu, “Vectorized Efficient Computation of Pade Approximation for Semi-Analytical Simulation of Large-Scale Power Systems,” *IEEE Transactions on Power Systems*, in press. (*Corresponding author*)
8. Rui Yao (#), **Kai Sun**, Di Shi, Xiaohu Zhang, “Voltage Stability Analysis of Power Systems with Induction Motors Based on Holomorphic Embedding,” *IEEE Transactions on Power Systems*, in press. (*Corresponding author*)
9. Chengxi Liu (#), Bin Wang (*), **Kai Sun**, “Fast Power System Dynamic Simulation Using Continued Fractions,” *IEEE Access*, in press. (*Corresponding author*)
10. Bin Wang (*), Nan Duan (*), **Kai Sun**, “A Time-Power Series Based Semi-Analytical Approach for Power System Simulation,” *IEEE Transactions on Power Systems*, Early Access at IEEEExplore (*Corresponding author*)
11. Weihong Huang (*), **Kai Sun**, “Optimization of SVC settings to improve post-fault voltage recovery and angular stability,” *Journal of Modern Power Systems and Clean Energy*, in press (*Corresponding author*)
12. Rui Yao (#), **Kai Sun**, “Towards Simulation and Risk Assessment of Weather-Related Outages,” *IEEE Transactions on Smart Grid*, Early Access at IEEEExplore. (*Corresponding author*)
13. Yongli Zhu (*), Chengxi Liu (#), **Kai Sun**, Di Shi, Zhiwei Wang, “Optimization of Battery Energy Storage to Improve Power System Oscillation Damping,” *IEEE Transactions on Sustainable Energy*, Early Access at IEEEExplore. (*Corresponding author*)
14. Chengxi Liu (#), **Kai Sun**, Bin Wang (*), Wenyun Ju (*), “Probabilistic Power Flow Analysis Using Multi-Dimensional Holomorphic Embedding and Generalized Cumulants,” *IEEE Transactions on Power Systems*, vol. 33, No. 6, pp. 7132-7142, November 2018. (*Corresponding author*)

15. Lei Ding, Yichen Guo, Peter Wall, **Kai Sun**, Vladimir Terzija, “Identifying the Timing of Controlled Islanding Using a Controlling UEP based Method,” *IEEE Transactions on Power Systems*, vol. 33, No. 6, pp. 5913-5922, November 2018.
16. Denis Osipov (*), **Kai Sun**, “Adaptive Nonlinear Model Reduction for Fast Power System Simulation,” *IEEE Transactions on Power Systems*, vol. 33, No. 6, pp. 6746-6754, November 2018. (*Corresponding author*)
17. Guoqiang Zu Jun Xiao, **Kai Sun**, “Mathematical Base and Deduction of Security Region for Distribution Systems with DER,” *IEEE Transactions on Smart Grid*, Early Access at IEEExplore.
18. Wenyun Ju (*), **Kai Sun**, Rui Yao (#), “Simulation of Cascading Outages Using a Power Flow Model Considering Frequency,” *IEEE Access*, vol. 6 No. 1, pp. 37784-37795, 2018 (*Corresponding author*)
19. Rui Yao (#), **Kai Sun**, Feng Liu, Shengwei Mei, “Efficient Simulation of Temperature Evolution of Overhead Transmission Lines Based on Analytical Solution and NWP,” *IEEE Transactions on Power Delivery*, vol. 33, No. 4, pp. 1576-1588, August 2018. (*Corresponding author*)
20. Rui Yao (#), **Kai Sun**, Feng Liu, Shengwei Mei, “Management of Cascading Outage Risk Based on Risk Gradient and Markovian Tree Search,” *IEEE Transactions on Power Systems*, vol. 33, No. 4, pp 4050-4060, July 2018. (*Corresponding author*)
21. Chengxi Liu (#), Bin Wang (*), Fengkai Hu (*), **Kai Sun**, Claus Leth Bak, “Online Voltage Stability Assessment for Load Areas Based on the Holomorphic Embedding Method,” *IEEE Transactions on Power Systems*, vol. 33, No. 4, pp 3720-3734, July 2018. (*Corresponding author*)
22. Daham Min, Seog-joo Kim, Sangsoo Seo, Young-Hwan Moon, **Kai Sun**, Joe H. Chow, Kyeon Hur, “Computing Safety Margins of a Generation Rejection Scheme: A Framework for Online Implementation,” *IEEE Transactions on Smart Grid*, vol. 9, No. 3, pp. 2337-2346, May 2018.
23. Miao Fan, **Kai Sun**, Derek Lane, Wei Gu, Zhengshuo Li, Fang Zhang, “A Novel Generation Rescheduling Algorithm to Improve Power System Reliability with High Renewable Energy Penetration,” *IEEE Transactions on Power Systems*, vol. 33, No. 3, pp. 3349-3357, May 2018.
24. Junjian Qi (#), Jianhui Wang, **Kai Sun**, “Efficient Estimation of Component Interactions for Cascading Failure Analysis by EM Algorithm,” *IEEE Transactions on Power Systems*, vol. 33, No. 3, pp. 3153-3161, May 2018.
25. Chongqing Kang, Zhe Chen, Ming Zhang, Oriol Gomis-Bellmunt, Mike Barnes, Jie Yan, Weihao Hu, **Kai Sun**, “Guest Editorial for the Special Section on Enabling Very High Penetration Renewable Energy Integration Into Future Power Systems,” *IEEE Transactions on Power Systems*, vol. 33, No. 3, pp. 3223-3226, May 2018.
26. Guoqiang Zu, Jun Xiao, **Kai Sun**, “Distribution Network Reconfiguration Comprehensively Considering N-1 Security and Network Loss,” *IET Generation, Transmission & Distribution*, vol. 12, No. 8, pp. 1721-1728, April 2018.
27. Tao Ding, **Kai Sun**, Can Huang, Zhaohong Bie, Fangxing Li, “Mixed Integer Linear Programming-based Splitting Strategies for Power System Islanding Operation Considering Network Connectivity,” *IEEE Systems Journal*, vol. 12, No. 1, pp. 350-359, March 2018.
28. Bin Wang (*), **Kai Sun**, Wei Kang, “Nonlinear Modal Decoupling of Multi-Oscillator Systems with Applications to Power Systems,” *IEEE Access*, vol. 6, pp. 9201-9217, 2018. (*Corresponding author*)
29. Amir Golshani, Wei Sun, **Kai Sun**, “An advanced power system partitioning method for fast and reliable restoration: towards a self-healing power grid,” *IET Generation, Transmission & Distribution*, vol. 12, No. 1, pp. 42-52, 2018.

30. Junjian Qi (#), **Kai Sun**, Jianhui Wang, Hui Liu, “Dynamic State Estimation for Multi-Machine Power System by Unscented Kalman Filter with Enhanced Numerical Stability,” *IEEE Transactions on Smart Grid*, vol. 9, No. 2, pp. 1184-1196, March 2018.
31. Yongli Zhu (*), Chengxi Liu (#), Bin Wang (*), **Kai Sun**, “Damping Control for a Target Oscillation Mode Using Battery Energy Storage,” *Journal of Modern Power Systems and Clean Energy*, February 2018. (*Corresponding author*)
32. Bin Wang (*), Chengxi Liu (#), **Kai Sun**, “Multi-Stage Holomorphic Embedding Method for Calculating the Power-Voltage Curve,” *IEEE Transactions on Power Systems*, vol. 33, No. 1, pp. 1127-1129, January 2018. (*Corresponding author*)
33. Chengxi Liu (#), Bin Wang (*), Xin Xu (*), **Kai Sun**, Di Shi, Claus Leth Bak, “A Multi-Dimensional Holomorphic Embedding Method to Solve AC Power Flows,” *IEEE Access*, vol. 5, No. 1, pp. 25270-25285, December 2017. (*Corresponding author*)
34. Weihong Huang (*), **Kai Sun**, Junjian Qi (#), Jiaxin Ning, “Optimal Allocation of Dynamic Var Sources Using the Voronoi Diagram Method Integrating Linear Programming,” *IEEE Transactions on Power Systems*, vol. 32, No. 6, pp. 4644-4655, Nov. 2017. (*Corresponding author*)
35. Rui Yao (#), Shaowei Huang, **Kai Sun**, Feng Liu, Xuemin Zhang, Shengwei Mei, Wei Wei, Lijie Ding, “Risk Assessment of Multi-timescale Cascading Outages based on Markovian Tree Search,” *IEEE Transactions on Power Systems*, vol. 32, No. 4, pp. 2887 - 2900, July 2017.
36. Wenyun Ju (*), **Kai Sun**, Junjian Qi, “Multi-Layer Interaction Graph for Analysis and Mitigation of Cascading Outages,” *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, vol. 7, No. 2, pp. 239-249, June 2017. (*Corresponding author*)
37. Tao Ding, **Kai Sun**, Qingrun Yang, Abdul Wahab Khan, Zhaohong Bie, “Mixed Integer Second Order Cone Relaxation with Dynamic Simulation for Proper Power System Islanding Operations,” *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, vol. 7, No. 2, pp.295-306, June 2017
38. Weihong Huang (*), **Kai Sun**, Junjian Qi (#), Jiaxin Ning, “Optimization of Dynamic Reactive Power Sources Using Mesh Adaptive Direct Search,” *IET Generation, Transmission & Distribution*, vol. 11, No. 15, pp. 3675-3682, 2017. (*Corresponding author*)
39. Hongbin Sun, Qinglai Guo, Marija D. Ilić, Qiuwei Wu, **Kai Sun**, Pengwei Du, “Guest Editorial for the Special Issue: Smart Grid Voltage Control,” *IET Generation, Transmission & Distribution*, vol. 11, No. 15, pp. 3655-3656, 2017
40. Fengkai Hu (*), **Kai Sun**, Di Shi, Zhiwei Wang, “Measurement-based Voltage Stability Assessment for Load Areas Addressing n-1 Contingencies,” *IET Generation, Transmission & Distribution*, vol. 11, No. 15, pp. 3731-3738, Oct. 2017. (*Corresponding author*)
41. Junjian Qi (#), Wenyun Ju (*), **Kai Sun**, “Estimating the Propagation of Interdependent Cascading Outages with Multi-Type Branching Processes,” *IEEE Transactions on Power Systems*, vol. 32, No. 2, pp. 1212-1223, March 2017. (*Corresponding author*)
42. Bin Wang (*), Xiaowen Su, **Kai Sun**, “Properties of the Frequency-Amplitude Curve,” *IEEE Transactions on Power Systems*, vol. 32, No. 1, pp. 826-827, January 2017. (*Corresponding author*)
43. Bin Wang (*), **Kai Sun**, “Location Methods of Oscillation Sources in Power Systems: A Survey,” *Journal of Modern Power Systems and Clear Energy*, vol. 5, No. 2, pp. 151-159, 2017. (*Corresponding author*)
44. Nan Duan (*), **Kai Sun**, “Power System Simulation Using the Adomian Decomposition Method,” *IEEE Transactions on Power Systems*, vol. 32, no. 1, pp. 430-441, January 2017. (*Corresponding author*)

45. Junjian Qi (#), Weihong Huang (*), **Kai Sun**, Wei Kang, “Optimal Placement of Dynamic Var Sources by Using Empirical Controllability Covariance,” *IEEE Transactions on Power Systems* vol. 32, no. 1, pp. 240-249, January 2017. (Corresponding author)
46. Huimin Gao, Xiaogao Xie, Jianmin Zhang, Chenxi Wu, **Kai Sun**, “Second-order oscillation mode study of hydropower system based on linear elastic model and modal series method,” *International Transactions on Electrical Energy Systems*, vol. 27, No. 1, January 2017 (DOI: 10.1002/etep.2233).
47. Feifei Bai, Yong Liu, Yilu Liu, **Kai Sun**, Navin Bhatt, Alberto Del Rosso, Evangelos Farantatos and Xiaoru Wang, “A measurement-based approach for power system instability early warning,” *Protection and Control of Modern Power Systems*, pp. 1-4, 2016 (DOI:10.1186/s41601-016-0014-0).
48. Bin Wang (*), **Kai Sun**, “Formulation and Characterization of Power System Electromechanical Oscillations,” *IEEE Transactions on Power Systems*, vol. 61, no. 6, pp. 5082-5093, November 2016. (Corresponding author)
49. Fengkai Hu (*), **Kai Sun**, Alberto Del Rosso, Evangelos Farantatos, Navin Bhatt, “Measurement-Based Real-Time Voltage Stability Monitoring for Load Areas,” *IEEE Transactions on Power Systems*, vol. 31, no. 4, pp. 2787 – 2798, July 2016. (Corresponding author)
50. **Kai Sun**, Junjian Qi (#), Wei Kang, “Observability and Dynamic State Estimation for Power System Stability Monitoring Using Synchrophasors,” *Control Engineering Practice*, vol. 53, pp. 160–172, August 2016. (Corresponding author)
51. Rui Yao (#), Shaowei Huang, **Kai Sun**, Feng Liu, Xuemin Zhang, Shengwei Mei, “A Multi-timescale Quasi-Dynamic Model for Simulation of Cascading Outages,” *IEEE Transactions on Power Systems*, vol. 31, no. 4, pp. 3189 – 3201, July 2016.
52. Feifei Bai, Lin Zhu, Yilu Liu, Xiaoru Wang, **Kai Sun**, Yiwei Ma, Mahendra Patel, Evangelos Farantatos, Navin Bhatt, “Design and Implementation of a Measurement-based Adaptive Wide-Area Damping Controller Considering Time Delays,” *Electric Power Systems Research*, vol. 130, pp. 1-9, January 2016.
53. Feifei Bai, Yong Liu, Yilu Liu, **Kai Sun**, Navin Bhatt, Alberto Del Rosso, Evangelos Farantatos, Xiaoru Wang, “Measurement-Based Correlation Approach for Power System Dynamic Response Estimation,” *IET Generation, Transmission & Distribution*, vol. 9, no. 12, pp. 1474-1484, Sep. 2015.
54. Yong Liu, **Kai Sun**, Yilu Liu, “A Measurement-based Power System Model for Dynamic Response Estimation and Instability Warning,” *Electric Power Systems Research*, vol. 124, pp. 1-9, 2015.
55. Junjian Qi (#), **Kai Sun**, Wei Kang, “Optimal PMU Placement for Power System Dynamic State Estimation by Using Empirical Observability Gramian,” *IEEE Transactions on Power Systems*, vol. 30, pp. 2041-2054, July 2015. (Corresponding author)
56. Junjian Qi (#), **Kai Sun**, Shengwei Mei, “An Interaction Model for Simulation and Mitigation of Cascading Failures,” *IEEE Transactions on Power Systems*, vol. 30, no. 2, pp. 804-819, March 2015. (Corresponding author)
57. Chengxi Liu, **Kai Sun**, Zakir Hussain Rather, Zhe Chen, Claus Leth Bak, Paul Thøgersen, Per Lund, “A Systematic Approach for Dynamic Security Assessment and the Corresponding Preventive Control Scheme Based on Decision Trees,” *IEEE Transactions on Power Systems*, vol. 29, no. 2, pp. 717-730, March 2014.
58. **Kai Sun**, Qiang Zhou, Yilu Liu, “A Phase Locked Loop-based Approach to Real-time Modal Analysis on Synchrophasor Measurements,” *IEEE Transactions on Smart Grid*, vol. 5, no. 1, pp. 260-269, Jan. 2014. (Corresponding author)
59. **Kai Sun**, Kyeon Hur, Pei Zhang, “A New Unified Scheme for Controlled Power System Separation Using Synchronized Phasor Measurements,” *IEEE Transactions on Power Systems*, vol. 26, no. 3, pp. 1544-1554, Aug. 2011. (Corresponding author)

60. Chong Wang, Vijay Vittal, **Kai Sun**, “OBDD-Based Sectionalizing Strategies for Parallel Power System Restoration,” *IEEE Transactions on Power Systems*, vol. 26, no. 3, pp. 1426-1433, Aug. 2011.
61. Yunhe Hou, Chen-Ching Liu, **Kai Sun**, Pei Zhang, Shanshan Liu, Dean Mizumura, “Computation of Milestones for Decision Support during System Restoration,” *IEEE Transactions on Power Systems*, vol. 26, no. 3, pp. 1399 – 1409, Aug. 2011.
62. **Kai Sun**, Stephen T. Lee, Pei Zhang, “An Adaptive Power System Equivalent for Real-time Estimation of Stability Margin using Phase-Plane Trajectories,” *IEEE Transactions on Power Systems*, vol. 26, pp. 915-923, May 2011. (*Corresponding author*)
63. Ruisheng Diao, **Kai Sun**, Vijay Vittal, Robert J. O’Keefe, Michael R. Richardson, Navin Bhatt, Dwayne Stradford, Sanjoy K. Sarawgi, “Decision Tree-Based Online Voltage Security Assessment Using PMU Measurements,” *IEEE Transactions on Power Systems*, vol. 24, pp. 832-839, May 2009.
64. **Kai Sun**, Siddharth Likhate, Vijay Vittal, V. Sharma Kolluri, Sujit Mandal, “An Online Dynamic Security Assessment Scheme using Phasor Measurements and Decision Trees,” *IEEE Transactions on Power Systems*, vol. 22, pp. 1935-1943, Nov 2007.
65. Ming Jin, Tarlochan S. Sidhu, **Kai Sun**, “A New System Splitting Scheme Based on the Unified Stability Control Framework,” *IEEE Transactions on Power Systems*, vol. 22, pp. 433-441, Feb 2007.
66. **Kai Sun**, Da-Zhong Zheng, Qiang Lu, “Searching for Feasible Splitting Strategies of Controlled System Islanding,” *IEE Proceedings Generation, Transmission & Distribution*, vol. 153, pp. 89-98, Jan 2006.
67. **Kai Sun**, Da-Zhong Zheng, Qiang Lu, “A Simulation Study of OBDD-based Proper Splitting Strategies for Power Systems under Consideration of Transient Stability,” *IEEE Transactions on Power Systems*, vol. 20, pp. 389-399, Feb 2005.
68. Qianchuan Zhao, **Kai Sun**, Da-Zhong Zheng, Jin Ma, Qiang Lu, “A Study of System Splitting Strategies for Island Operation of Power System: A Two-phase Method Based on OBDDs,” *IEEE Transactions on Power Systems*, vol.18, pp.1556-1565, Nov 2003.
69. **Kai Sun**, Da-Zhong Zheng, Qiang Lu. “Splitting Strategies for Islanding Operation of Large-scale Power Systems Using OBDD-based Methods,” *IEEE Transactions on Power Systems*, vol.18, pp. 912-923, May 2003.
70. **Kai Sun**, Qianchuan Zhao, Da-Zhong Zheng, “A Hybrid Control for Autonomous Systems of Electric Power Supply,” *Journal of Control Theory and Applications*, vol. 19, pp. 23-28, Feb 2002.

Other Journal Articles:

1. **Kai Sun**, “Coherency Theory - An Excellent Reference on the Subject,” *IEEE Power and Energy Magazine*, vol. 12, No. 1, pp. 102-104, Jan 2014.

Conference Papers (total: 72)

1. Wenyun Ju (*), Rui Yao (#), **Kai Sun**, Chien-fei Chen, “Demand Response to Help Mitigate Cascading Outages: A Case Study on the 2011 Tornado Super Outbreak,” 2019 IEEE PES General Meeting in Atlanta, GA.
2. Wenyun Ju (*), **Kai Sun**, Rui Yao (#), “Interaction Graph-Based Active Islanding to Mitigate Cascading Outages,” 2019 IEEE PES General Meeting in Atlanta, GA.
3. Xin Xu (*), Bin Wang (*), **Kai Sun**, “Approximation of Closest Unstable Equilibrium Points via Nonlinear Modal Decoupling,” 2019 IEEE PES General Meeting in Atlanta, GA.

4. Denis Osipov (*), Nan Duan (*), Srikanth Allu, Srdjan Simunovic, Aleksandar Dimitrovski, **Kai Sun**, “Distributed Parareal in Time with Adaptive Coarse Solver for Large Scale Power System Simulations,” 2019 IEEE PES General Meeting in Atlanta, GA.
5. Mirka Mandich (*), Tianwei Xia (*), **Kai Sun**, “Optimal PMU Placement Using Stochastic Methods,” 2019 IEEE PES General Meeting in Atlanta, GA.
6. Chengxi Liu (#), Claus Leth Bak, Yongli Zhu (*), **Kai Sun**, “Analytical Solutions for Power Flow Equations Based on the Multivariate Quotient-Difference Method,” IEEE PES Powertech, June 23-27, 2019, Milano, Italy.
7. Wenyun Ju (*), Bin Wang (*), **Kai Sun**, “Estimating Transient Stability Margin Regarding a Dominant Oscillation Mode,” IEEE PES Powertech, June 23-27, 2019, Milano, Italy.
8. Xin Xu (*), Bin Wang (*), **Kai Sun**, “Initial Study of the Power System Stability Boundary Estimated from Nonlinear Modal Decoupling,” IEEE PES Powertech, June 23-27, 2019, Milano, Italy.
9. Yang Liu (*), **Kai Sun**, Bin Wang (*), Rui Yao, Wei Kang, “A Sparse Grid Scheme for Fast Transient Stability Simulation with Reduced Redundancy,” IEEE PES Powertech, June 23-27, 2019, Milano, Italy.
10. Bin Wang (*), Xin Xu (*), **Kai Sun**, “Power System Transient Stability Analysis Using High-Order Taylor Expansion Systems,” IEEE Texas Power and Energy Conference (TPEC), in College Station, TX, USA, Feb 7-8, 2019.
11. Xin Xu (*), Chengxi Liu (#), **Kai Sun**, “A Holomorphic Embedding Method to Solve Unstable Equilibrium Points of Power Systems,” IEEE CDC 2018
12. Nan Duan (*), Weihong Huang (*), **Kai Sun**, Xiaochuan Luo, Qiang Zhang, “Multiple-shaft Turbine Model Reduction by Fractional-order Modeling,” 2018 IEEE PES General Meeting
13. Nan Duan (*), Srdjan Simunovic, Aleksandar Dimitrovski, **Kai Sun**, “Improving the Convergence Rate of Parareal-in-time Power System Simulation using the Krylov Subspace,” 2018 IEEE PES General Meeting
14. Denis Osipov (*), Nan Duan (*), Aleksandar Dimitrovski, Srikanth Allu, Srdjan Simunovic, **Kai Sun**, “Adaptive Model Reduction for Parareal in Time Method for Transient Stability Simulations,” 2018 IEEE PES General Meeting
15. Q. Shi, Y. Xu, Y. Sun, W. Feng, F. Li, **K. Sun**, “Analytical Approach to Estimating the Probability of Transient Stability under Stochastic Disturbances,” 2018 IEEE PES General Meeting
16. Bin Wang (*), Yichen Zhang, **Kai Sun**, Kevin Tomsovic, “Quantifying the Synthetic Inertia and Load-Damping Effect of a Converter-Interfaced Power Source,” EnergyCon 2018, Limassol, Cyprus, June 3-7, 2018.
17. Yongli Zhu (*), Chengxi Liu (#), **Kai Sun**, “Image Embedding of PMU Data for Deep Learning towards Transient Disturbance Classification,” IEEE the 2nd International Conference on Energy Internet, Beijing, China, May 21-25, 2018.
18. Nan Duan (*), Aleksandar Dimitrovski, Srdjan Simunovic, **Kai Sun**, Junjian Qi, Jianhui Wang, “Embedding Spatial Decomposition in Parareal in Time Power System Simulation,” IEEE ISGT, Feb. 19-22, 2018, Washington, DC.
19. Yongli Zhu (*), Bin Wang (*), **Kai Sun**, “Damping Control for Power Systems Using Energy Storage,” 29th Chinese Control and Decision Conference, Chongqing, China, May 28-30, 2017.
20. Wenyun Ju (*), Bin Wang (*), **Kai Sun**, “Can Nonlinear Electromechanical Oscillation be Analyzed Using an Equivalent SMIB System?” IEEE PES General Meeting, July 16-20, 2017, Chicago, IL.
21. Y. Wang, H. Pulgar-Painemal, **K. Sun**, “Online analysis of voltage security in a microgrid using convolutional neural networks,” IEEE PES General Meeting, July 16-20, 2017, Chicago, IL.

22. I.R. Cabrera (*), Bin Wang (*), **Kai Sun**, “A Method to Locate the Source of Forced Oscillations Based on Linearized Model and System Measurements,” IEEE PES General Meeting, July 16-20, 2017, Chicago, IL.
23. Chengxi Liu (#), Bin Wang (*), **Kai Sun**, “Fast Power System Simulation Using Semi-Analytical Solutions Based on Pade Approximants,” IEEE PES General Meeting, July 16-20, 2017, Chicago, IL.
24. Eric Abreut (*), Bin Wang (*), **Kai Sun**, “Semi-Analytical Fault-on Trajectory Simulation and Its Application in Direct Methods,” IEEE PES General Meeting, July 16-20, 2017, Chicago, IL.
25. N. Duan (*), A. Dimitrovski, S. Simunovic, **K. Sun**, “Applying Reduced Generator Models in the Coarse Solver of Parareal in Time Parallel Power System Simulation,” IEEE PES Innovative Smart Grid Technologies Europe (ISGT Europe) Conference, October 9-12, 2016, Ljubljana, Slovenia.
26. J. Qi (#), **K. Sun**, W. Kang, “Adaptive Optimal PMU Placement Based on Empirical Observability Gramian,” IFAC Symposium on Non-Linear Control Systems (NOLCOS), August 23-25, 2016, Monterey, CA.
27. A. C. Teron (*), A. Bartlett (*), N. Duan (*), **K. Sun**, “Estimating the Nonlinear Oscillation Frequency of a Power System Using the Harmonic Balanced Method,” IEEE PES General Meeting, July 17-21, 2016, Boston, MA.
28. D. Osipov (*), F. Hu (*), **K. Sun**, “Voltage Stability Margin Estimation for a Load Area Using a Three-Bus Equivalent,” IEEE PES General Meeting, July 17-21, 2016, Boston, MA.
29. F. Hu (*), L. Yang, J. Wang, Y. Ma, **K. Sun**, L.M. Tolbert, F. Wang, “Measurement-based Voltage Stability Assessment and Control on CURENT Hardware Test Bed System,” IEEE PES General Meeting, July 17-21, 2016, Boston, MA.
30. S. Maslennikov, B. Wang (*), Q. Zhang, F. Ma, X. Luo, **K. Sun**, E. Litvinov, “A Test Cases Library for Methods Locating the Sources of Sustained Oscillations,” IEEE PES General Meeting, July 17-21, 2016, Boston, MA.
31. Y. Tong, J. Sun, **K. Sun**, P. Li, “Outsourcing Power System Simulations,” IEEE GLOBECOM, December 6-10, 2015, San Diego, CA.
32. Y. Tong, J. Sun, **K. Sun**, “Privacy-preserving spectral estimation in smart grid,” IEEE SmartGridComm Symposium, November 2-5, 2015, Miami, FL.
33. F. Bai, H. Liu, L. Zhu, Y. Liu, **K. Sun**, X. Wang, M. Patel, E. Farantatos, “A Measurement-based Control Input-output Signal Selection Approach to Damp Inter-area Oscillations,” IEEE PES Asia-Pacific Power & Energy Engineering Conference (APPEEC), November 15-18, 2015, Brisbane, Australia.
34. T. Ding, **K. Sun**, F. Li, H. Sun, X. Zhang, “Graph Theory Based Splitting Strategies for Power System Islanding Operation,” IEEE PES General Meeting, July 26-30, 2015, Denver, CO.
35. G. Gurrala, A. Dimitrovski, P. Sreekanth, S. Simunovic, M. Starke, **K. Sun**, “Application of Adomian Decomposition for Multi-Machine Power System Simulation,” IEEE PES General Meeting, July 26-30, 2015, Denver, CO.
36. N. Duan (*), B. Wang (*), **K. Sun**, “Analysis of Power System Oscillation Frequency Using Differential Groebner Basis and the Harmonic Balance Method,” IEEE PES General Meeting, July 26-30, 2015, Denver, CO.
37. Y. Zhu (*), R. Azim (*), H. A. Saleem (*), **K. Sun**, D. Shi, R. Sharma, “Microgrid Security Assessment and Islanding Control by Support Vector Machine,” IEEE PES General Meeting, July 26-30, 2015, Denver, CO.
38. B. Wang (*), **K. Sun**, X. Su, “An Oscillation Decoupling Based Direct Method for Power System Transient Stability Analysis,” IEEE PES General Meeting, July 26-30, 2015, Denver, CO.

39. W. Ju (*), J. Qi (#), **K. Sun**, "Simulation and Analysis of Cascading Failures on an NPCC Power System Test Bed," IEEE PES General Meeting, July 26-30, 2015, Denver, CO.
40. E. Farantatos, A. Del Rosso, N. Bhatt, **K. Sun**, Y. Liu, L. Min, C. Jing, J. Ning, M. Parashar, "A Hybrid Framework for Online Dynamic Security Assessment Combining High Performance Computing and Synchrophasor Measurements," IEEE PES General Meeting, July 26-30, 2015, Denver, CO.
41. M. Nakmali (*), D. Osipov (*), **K. Sun**, "A New Hybrid Approach to Thevenin Equivalent Estimation for Voltage Stability Monitoring," IEEE PES General Meeting, July 26-30, 2015, Denver, CO.
42. W. Huang (*), **K. Sun**, J. Qi (#), Y. Xu, "Voronoi Diagram Based Optimization of Dynamic Reactive Power Sources," IEEE PES General Meeting, July 26-30, 2015, Denver, CO.
43. N. Duan (*), **K. Sun**, "Application of the Adomian Decomposition Method for Semi-Analytic Solutions of Power System Differential Algebraic Equations," Powertech, June 29-July 2, 2015, Eindhoven, Netherlands.
44. R. Azim (*), **K. Sun**, F. Li, Y. Zhu (*), H. A. Saleem (*), D. Shi, R. Sharma, "A Comparative Analysis of Intelligent Classifiers for Passive Islanding Detection in Microgrids," Powertech, June 29-July 2, 2015, Eindhoven, Netherlands.
45. R. Azim (*), Y. Zhu (*), H. A. Saleem (*), **K. Sun**, F. Li, D. Shi, R. Sharma, "A Decision Tree Based Approach for Microgrid Islanding Detection," IEEE PES Innovative Smart Grid Technologies (ISGT) Conference, February 17-20, 2015, Washington DC.
46. A.D. Rosso, E. Farantatos, N. Bhatt, **K. Sun**, Y. Liu, C. Jing, J. Ning, "Hybrid Simulation/Measurement-Based Framework for Online Dynamic Security Assessment," CIGRE - The Grid of the Future Conference, October 19-21, 2014, Houston, TX.
47. **K. Sun**, W. Kang, "Observability and Estimation Methods Using Synchrophasor," The 19th World Congress of the International Federation of Automatic Control (IFAC), Cape Town, South Africa, August 24-29, 2014.
48. Feifei Bai, Yong Liu, Yilu Liu, **Kai Sun**, Xiaoru Wang, Navin Bhatt, Alberto Del Rosso, Evangelos Farantatos, "Measurement-Based and Modeling-Based Methods to Establish Input-Output Relationship for System Identification-Based Models," IEEE PES General Meeting, July 27-31, 2014, National Harbor, MD.
49. Yin Lei, Yong Liu, Gefei Kou, Bin Wang (*), Changgang Liu, **Kai Sun**, Yilu Liu, Kevin Tomsovic, Joe Chow, "A Study on Wind Frequency Control under High Wind Penetration on an NPCC System Model," IEEE PES General Meeting, July 27-31, 2014, National Harbor, MD.
50. B. Trento, B. Wang (*), **K. Sun**, and L. M. Tolbert, "Integration of Phase-Locked Loop Based Real-time Oscillation Tracking in Grid Synchronized Systems," IEEE PES General Meeting, July 27-31, 2014, National Harbor, MD.
51. F. Hu (*), **K. Sun**, et al, "An Adaptive Three-bus Power System Equivalent for Estimating Voltage Stability Margin from Synchronized Phasor Measurements," IEEE PES General Meeting, July 27-31, 2014, National Harbor, MD.
52. L. E. Bernal (*), F. Hu (*), **K. Sun**, E Farantatos, "Identification and Wide-area Visualization of the Centers of Oscillation for a Large-scale Power System," IEEE PES General Meeting, July 27-31, 2014, National Harbor, MD.
53. B. Wang (*), **K. Sun**, A. D. Rosso, E. Farantatos, N. Bhatt, "A Study on Fluctuations in Electromechanical Oscillation Frequencies of Power Systems," IEEE PES General Meeting, July 27-31, 2014, National Harbor, MD.

54. W. Huang (*), **K. Sun**, J. Qi (#), Y. Xu, "A New Approach to Optimization of Dynamic Reactive Power Sources Addressing FIDVR Issues," IEEE PES General Meeting, July 27-31, 2014, National Harbor, MD.
55. Feifei Bai, Yilu Liu, **Kai Sun**, Navin Bhatt, Xiaoru Wang, "Input Signals Selection for Measurement-Based Power System ARX Dynamic Model Response Estimation," IEEE PES Transmission & Distribution (T&D) Conference and Exposition, April 14-17, 2014, Chicago, IL.
56. Changgang Li, Yong Liu, **Kai Sun**, Yilu Liu, Navin Bhatt, "Measurement Based Power System Dynamics Prediction with Multivariate AutoRegressive Model," IEEE PES Transmission & Distribution (T&D) Conference and Exposition, April 14-17, 2014, Chicago, IL.
57. **K. Sun**, F. Hu (*), N. Bhatt, "A New Approach for Real-Time Voltage Stability Monitoring Using PMUs," IEEE PES Innovative Smart Grid Technologies Asia (ISGT Asia) Conference, May 20-23, 2014, Kuala Lumpur, Malaysia.
58. G. Wang, C.-C. Liu, N. Bhatt, E. Farantatos, **K. Sun**, "Observability for PMU-based monitoring of nonlinear power system dynamics," 2013 IREP Symposium - Bulk Power System Dynamics and Control – IX, Aug. 25-30, 2013, Rethymnon, Greece.
59. **K. Sun**, X. Luo, J. Wong, "Early Warning of Wide-Area Angular Stability Problems Using Synchrophasors," IEEE PES General Meeting, July 23-26, 2012, San Diego, CA.
60. Y. Liu, **K. Sun**, Y. Liu, "Measurement-based Power System Dynamic Model for Response Estimation," IEEE PES General Meeting, July 23-26, 2012, San Diego, CA.
61. F. Galvan, A. Abur, **K. Sun**, V. Venkatasubramanian, "Implementation of Synchrophasor Monitoring at Entergy: Tools, Training and Tribulations," IEEE PES General Meeting, July 23-26, 2012, San Diego, CA.
62. G. Zhang, **K. Sun**, H. Chen, R. Carroll, Y. Liu, "Application of Synchrophasor Measurements for Improving Operator Situational Awareness," IEEE PES General Meeting, July 24-29, 2011, Detroit, MI.
63. **K. Sun**, P. Zhang, N.S.B.N. Yusuf, "Predicting Post-contingency Stability Margin Using Synchrophasors," IEEE PES General Meeting, July 25-29, 2010, Minneapolis, MN.
64. Y. Hou, C.-C. Liu, P. Zhang, **K. Sun**, "Constructing power system restoration strategies," IEEE International Conference ELECO, November 5-8, 2009, Bursa, Turkey.
65. R. Diao, V. Vittal, **K. Sun**, S. Kolluri, S. Mandal, F. Galvan, "Decision Tree Assisted Controlled Islanding for Preventing Cascading Events," IEEE PES Power Systems Conference & Exposition, March 15-18, 2009, Seattle, WA.
66. N. Bhatt, S. Sarawgi, R. O'Keefe, P. Duggan, M. Koenig, M. Leschuk, S. Lee, **K. Sun**, V. Kolluri, S. Mandal, M. Peterson, D. Brotzman, S. Hedden, E. Litvinov, S. Maslennikov, X. Luo, E. Uzunovic, B. Fardanesh, L. Hopkins, A. Mander, K. Carman, M.Y. Vaiman, M.M. Vaiman, M. Povolotskiy, "Assessing Vulnerability to Cascading Outages," IEEE PES Power Systems Conference & Exposition, March 15-18, 2009, Seattle, WA.
67. Ross Baldick, Badrul Chowdhury, Ian Dobson, Zhaoyang Dong, Bei Gou, David Hawkins, Zhenyu Huang, Manho Joung, Janghoon Kim, Daniel Kirschen, Stephen Lee, Fangxing Li, Juan Li, Zuyi Li, Chen-Ching Liu, Xiaochuan Luo, Lamine Mili, Stephen Miller, Marvin Nakayama, Milorad Papic, Robin Podmore, John Rossmair, Kevin Schneider, Hongbin Sun, **K. Sun**, David Wang, Zhigang Wu, Liangzhong Yao, Pei Zhang, Wenjie Zhang, Xiaoping Zhang (IEEE PES CAMS Task Force on Understanding, Prediction, Mitigation and Restoration of Cascading Failures), "Vulnerability Assessment for Cascading Failures in Electric Power Systems," IEEE PES Power Systems Conference & Exposition, March 15-18, 2009, Seattle, WA
68. Ross Baldick, Badrul Chowdhury, Ian Dobson, Zhaoyang Dong, Bei Gou, David Hawkins, Henry Huang, Manho Joung, Daniel Kirschen, Fangxing Li, Juan Li, Zuyi Li, Chen-Ching Liu, Lamine Mili, Stephen

Miller, Robin Podmore, Kevin Schneider, **K. Sun**, David Wang, Zhigang Wu, Pei Zhang, Wenjie Zhang, Xiaoping Zhang (IEEE PES CAMS Task Force on Understanding, Prediction, Mitigation and Restoration of Cascading Failures), “Initial review of methods for cascading failure analysis in electric power transmission systems,” IEEE PES General Meeting, July 20-24, 2008, Pittsburgh, PA.

69. **K. Sun**, S. Lee, “Power System Security Pattern Recognition Based on Phase Space Visualization,” IEEE Int. Conf. on Electric Utility Deregulation and Restructuring and Power Technologies (DRPT 2008), April 6-9, 2008, Nanjing, China.
70. **K. Sun**, T. S. Sidhu, M. Jin, “Online Pre-Analysis and Real-Time Matching for Controlled Splitting of Large-Scale Power Networks,” IEEE Intl. Conf. Future Power Systems, November 16-18, 2005, Amsterdam, Netherlands.
71. M. Jin, T. S. Sidhu, **K. Sun**, “A System Splitting Scheme Based on the Identification of Controlling Group,” IEEE Intl. Conf. Future Power Systems, November 16-18, 2005, Amsterdam, Netherlands.
72. **K. Sun**, Q. Zhao, J. Ma, Q. Lu, “A Two-phase Method Based on OBDD for Searching for Splitting Strategies of Large-scale Power Systems,” IEEE PowerCon 2002, October 13-17, 2002, Kunming, China.

Published Technical Reports (total: 17)

1. E. Farantatos, B. Amidan, R. Arghandeh, D. Bienstock, P. Etingov, S. Murphy, F. Omitaomu, M. Rhodes, T. Rizy, A. K. Srivastava, **K. Sun**, X. Zhou, “Data Mining Techniques and Tools for Synchrophasor Data,” *NASPI White Paper*, 2019.
2. N. Bhatt, E. Farantatos, A. Del Rosso, **K. Sun**, F. Hu, “Real-Time Reactive Power Management and Voltage Control: Hybrid Voltage Stability Assessment (HVSA)”, EPRI Product ID: 3002002868, 2014.
3. **K. Sun**, F. Hu, N. Bhatt, E. Farantatos, A. Del Rosso, “Hybrid Voltage Stability Assessment (HVSA): Integration of Simulation-Based and Measurement-Based Approaches in Real-Time Operation,” EPRI Product ID: 3002001313, 2013.
4. W. Kang, **K. Sun**, “Detection of Instability Using Synchrophasors: A Theoretical Investigation on Observability with Synchrophasor Networks,” EPRI Product ID: 3002002061, 2013.
5. A. Del Rosso, **K. Sun**, Y. Liu, G. Zhang, H. Chen, “Demonstration of a Novel Synchrophasor-based Situational Awareness System: Wide Area Power System Visualization, On-line Event Replay and Early Warning of Grid Problems”, DOE/EPRI Report DOE-DE-OE0000128, March 2012.
6. C. Liu, G. Wang, Y. Liu, **K. Sun**, N. Bhatt, E. Farantatos, “Comprehensive Stability Analysis Using Synchrophasors”. EPRI Product ID: 1024264, 2012.
7. E. Farantatos, **K. Sun**, A. Del Rosso (PM), “A Hybrid Framework for Voltage Security Assessment Integrating Simulation- and Measurement-Based Approaches,” EPRI Product ID: 1024260, 2012.
8. **K. Sun**, C. Liu, T. Yong, “Visualization of Comprehensive Operating Boundary and Margin Information for Situational Awareness: Methodologies and Functional Requirements,” EPRI Product ID: 1021924, 2011.
9. **K. Sun**, Y. Wang, “Program on Technology Innovation: Online Power System Stability Assessment Using Real-time Measurements - Estimating Stability Margin from Measured Dynamic Trajectories,” EPRI Product ID: 1022397, 2010.
10. C. Liu, **K. Sun**, “Indication of Potential Cascading Outages Using Measurement Data,” EPRI Product ID: 1020051, 2010.
11. **K. Sun**, G. Zhang, “Preventing, Controlling and Mitigating Power System Separation: Developing an Early Warning and Decision Support Tool,” EPRI Product ID: 1020057, 2010.

12. C. Liu, Y. Hou, **K. Sun**, S. Liu, “Prototyping a Decision Support Tool for Evaluation of System Restoration Strategy Options,” EPRI Product ID: 1017799, 2009.
13. **K. Sun**, K. Hur, “Application of Phasor Measurement Units for Controlled System Separation,” EPRI Product ID: 1017800, 2009.
14. **K. Sun**, K. Hur, “Phasor Measurement Unit-Based Out-of-Step Protection Scheme,” EPRI Product ID: 1020377, 2009.
15. **K. Sun**, P. Zhang, L. Min, “Measurement-based Voltage Stability Monitoring and Control for Load Centers,” EPRI Product ID: 1017798, 2009.
16. **K. Sun**, P. Zhang, “Controlled System Separation,” EPRI Product ID: 1015993, 2008.
17. P. Zhang, **K. Sun**, “Effective Use of Distributed Phasor Measurement Units and Disturbance Monitoring Devices for Wide-Area Monitoring, Load Modeling and Voltage Instability Load Shedding,” EPRI Product ID: 1018432, 2008.

INVITED TALKS

1. *Nonlinear Modal Decoupling: a New Paradigm of Stability Analysis and Control for Power Systems and Other Multi-Oscillator Systems*, **SIAM Conference on Control & its Applications**, Chengdu, China, June 21, 2019
2. *Nonlinear Modal Decoupling for Stability Analysis of Multi-Machine Power Systems*, **CURRENT Power and Energy Seminar**, January 18, 2019.
3. Multi-dimensional Holomorphic Embedding Method for Voltage Stability Analysis, at **ABB Corporate Research**, Raleigh, NC, August 17, 2018
4. *Measurement-based Voltage Stability Monitoring and Control for Load Areas* at **PSDP Panel Session “Real-time Voltage Control and Stability Monitoring” with 2018 IEEE PES General Meeting**, Portland, OR, August 8, 2018
5. *Test Cases Library and Real-life Oscillation Examples* at **PSDP Panel Session “Finding the Sources of Sustained Oscillations – From Theory to Industry Practice” with 2018 IEEE PES General Meeting**, Portland, OR, August 8, 2018
6. Nonlinear Modal Decoupling of Multi-Oscillator Systems with Applications to Power Systems, at **Xi’an Jiaotong University**, June 19, 2018
7. A Semi-Analytical-Semi-Numerical Framework for Faster Power System Simulation, at **North China Electric Power University**, Beijing May 30, 2018
8. A Semi-Analytical-Semi-Numerical Framework for Faster Power System Simulation, at **China Electric Power Research Institute**, Beijing May 29, 2018
9. *A Semi-Analytical Framework for Faster Deterministic and Stochastic Power System Simulations* at **PSDP DSA Panel Session with 2017 IEEE PES General Meeting**, Chicago, IL, July 19, 2017.
10. *Modern Power Grid Stability Assessment: Moving from Online to Faster-Than-Real-Time*, **Texas A&M University**, March 24, 2017.
11. *Locating the Source of Sustained Oscillation* at **IEEE PES tutorial “Use of Synchrophasors in Grid Operations – From Oscillation Source Detection to Other Use Cases”** in Boston, MA, July 19, 2016.
12. *WAMS based Controlled System Separation to Mitigate Cascading Outages* at the **American Control Conference Workshop on Smart Grid Control**, Boston, MA, July 5, 2016,

13. *Faster-Than-Real-Time Power System Stability Assessment*, at **Tianjin University**, Tianjin, on May 29, 2016.
14. *Future power grid stability assessment and control* at the **Symposium on Emerging Frontiers in Systems and Control, Tsinghua University**, Beijing, May 27, 2016.
15. *Measurement-based Power System Stability Assessment*, at **Beijing Jiaotong University**, Beijing, on May 24, 2016
16. *Development and Demonstration of CURENT Testbed Systems* at the **2016 i-PCGRID (Innovations in Protection & Control for Greater Reliability Infrastructure Development) Workshop**, San Francisco, CA, March 30, 2016.
17. *Measurement-Based Real-Time Voltage Stability Monitoring for Load Areas* at **NASPI Working Group Meeting** in Atlanta GA on March 24, 2016
18. *Decision Support Tools for Power System Restoration*, at **Northeast Power Coordinating Council Restoration Working Group Meeting**, Boston, MA, November 3-4, 2015.
19. *Hybrid Voltage Stability Assessment Using Simulation and Measurement Based Approaches*, **Tsinghua University**, Beijing, May 13, 2015
20. *Controlled system separation to mitigate cascading failures using wide-area measurement data*, **Beijing Jiaotong University**, Beijing, May 7, 2015.
21. *Decision Trees Based Systematic Approach for Dynamic Security Assessment and Preventive Control in a Power Grid* at **Beijing Jiaotong University**, Beijing, China on June 6, 2014
22. *Prevention and Mitigation of Cascading Outages: New Challenges and Thinking*, **Tsinghua University**, Beijing, China, June 3, 2014
23. *Hybrid voltage stability assessment tool* at Southwest Power Pool, Little Rock, AR, June 11, 2013
24. *Real Time Predictive Capabilities for Power System Stability and Control: A hybrid approach* at **US DOE Advanced Grid Modeling Workshop** in Knoxville, TN on Feb 5, 2013
25. *Real-time Wide-area Situational Awareness and Stability Control Using Synchrophasors* at the **NSF US-China Workshop "Identification of Challenges and Opportunities for Large Scale Deployment of the Smart Grid"**, Arlington, VA, Feb 28-Mar 1, 2013.
26. *Demonstration of a Synchrophasor based Wide Area Situational Awareness System* at **NASPI Working Group Meeting** in Atlanta GA on Oct 18, 2012
27. *Early Warning of Wide-Area Angular Stability Problems Using Synchrophasors* at the **PSDP Power System Early Warning Panel** with 2012 IEEE PES general meeting in San Diego, CA on July 24, 2012
28. *Prevention and Mitigation of Cascading Outages in Power Grids Using Wide-Area Synchrophasor Measurements* at the **32nd CNLS (Center for Nonlinear Studies) Annual Conference** in Santa Fe, NM on May 25, 2012
29. *Demonstration of a Synchrophasor-based Situational Awareness System* at the **DOE Synchrophasor Application Workshop** at Tennessee Valley Authority in Chattanooga, TN on October 23, 2012
30. *Demonstration of a Synchrophasor-based Situational Awareness System* at the **NASPI Working Group Meeting** in Burlingame, CA on October 12, 2011
31. *Introduction of EPRI Synchrophasor R&D Projects* at Arizona State University on April 16, 2010.
32. *Vision on a Self-healing Smart Transmission Grid* at **EPRI/TVA Self-healing, Protection and Control Workshop** in Knoxville, TN on April 16, 2009
33. *Precursor Signals of Cascading Outages based on Visualization of PMU Data* at the **NASPI Working Group Meeting** in New Orleans, LA on October 16, 2008

34. *Controlled System Separation: Issues and State-of-the-Art Technologies* at the **EPRI/Center Point Energy Controlled Separation and System Restoration Workshop** in Houston, TX on November 12, 2008
35. *Hierarchical Temporal Memory based Power System Stability Pattern Recognition* at the **NASPI Working Group Meeting** in Montreal, Canada on September 6, 2007

OTHER ACTIVITIES AND SERVICES

Committee member, session chair and proposal panelist/reviewer

1. Panelist, DOE Office of Solar Energy Technologies “Advanced Systems Integration for Solar Technologies” Award (DE-FOA-0001987) Proposals, January 2019.
2. Reviewer for DOE Office of Science “Building EPSCoR-State/National Laboratory Partnerships” Award (DE-FOA-0001897) Proposals, June 2018.
3. Reviewer for New University Researchers Start-up Program of the Fonds de recherche du Québec - Nature et technologies, December 2017
4. Reviewer for DFG (Deutsche Forschungsgemeinschaft, Germany) grant proposals, December 2017.
5. Reviewer for NSERC (Canada) Discovery Grant proposals, December 2017
6. Panelist, NSF CAREER Award proposals, 2016
7. Proposal Reviewer for THEC Center for Excellence in Applied Computational Science & Engineering CEACSE Grants, March 2016
8. Panelist, MIT-Skoltech Initiative Research Center proposals, 2013.
9. Webmaster of IEEE PES Task Force on Oscillation Source Location since 2016
10. Session Chair at the IEEE International Energy Conference (EnergyCon), June 3-7, 2018, Limassol, Cyprus.
11. Session Chair at the 2nd IEEE international Conference on Energy Internet on May 21-25, 2018, Beijing, China
12. Session Chair of the Transactions Paper Session T12 at IEEE PES General Meeting on July 17-21, 2016, Boston, MA.
13. Session Chair of the Paper Forum Session at IEEE PES General Meeting on July 26-30, 2015, Denver, CO.
14. Technical Program Committee member and session chair of IEEE GreenTech Conference, April 15-17, 2015, New Orleans, LA.
15. Panel Chair at the First International Workshop on Power Grid-Friendly Computing (PGFC 2012) in the 3rd IEEE International Green Computing Conference (IGCC'12), June 5, 2012, San Jose, CA.
16. Session Chair of “Cascading Failures” Panel in IEEE PES General Meeting on July 24-29, 2011, Detroit, MI.

College and Departmental Services

17. College Reliability and Maintainability Engineering Advisory Committee, 2013 - Present
18. Department Undergraduate Committee, 2015- Present
19. Smart Grid Faculty Search Committee, 2018
20. Power Electronics Faculty Search Committee, 2013
21. Power Systems Faculty Search Committee, 2014

ADVISED VISITING SCHOLARS

1. Dr. Ping Ma (visiting professor from Qingdao University, China), 11/2012-5/2013
2. Dr. Chengxi Liu (visiting PhD student from Aalborg University, Denmark), 10/2012-4/2013
3. Dr. Rui Yao (visiting PhD student from Tsinghua University, China), 9/2014-3/2015
4. Dr. Dongheng Cai (visiting PhD student from UESTC, China), 9/2014-9/2015
5. Dr. Hualiang Fang (visiting professor from Wuhan University, China), 2/2015-2/2016
6. Dr. José Iván Reyes Cabrera (visiting PhD student from CINVESTAV, México), 10/2015-8/2016,
7. Dr. Huimin Gao (visiting professor from Hangzhou Dianzi University, China), 4/2016-10/2016
8. Dr. Guoqiang Zu (visiting PhD student from Tianjin University, China), 9/2016 – 9/2017
9. Yichen Guo (visiting PhD student from Shandong University, China), 10/2016 – Present
10. Changsheng Chen (visiting PhD student from China Electric Power Research Institute) 7/2018 – Present
11. Dr. Yanhui Xu (visiting professor from North China Electric Power University) 9/2018 – Present
12. Li Sun (visiting PhD student from The University of Hong Kong, China) 10/2018- Present

SOFTWARE PRUDUCTS

1. Online Measurement-Based Voltage Stability Assessment Tool (MBVSA) Version 1.0 Beta, EPRI Product ID: 1024989, 2012
2. Synchrophasor-based Wide-Area Situation Awareness Tool (WASAT) Version 1.0 Beta, EPRI Product ID: 1023123, 2012
3. System Separation Decision Support (SSDS) Tool Version 1.0, EPRI Product ID: 1021714, 2011
4. Measurement-Based Voltage Stability Analysis (MVSA) Tool Version 1.0, EPRI Product ID: 1020053, 2010
5. Measurement-based Voltage Stability Margin Calculator (MVSMC) Version 1.0, EPRI Product ID: 1020264, 2009