



IEEE PES Task Force on Forced Oscillations

Sponsored by IEEE PES PSDP Committee and PSSC Subcommittee

Chairs: Kai Sun (UTK) and Jim Follum (PNNL)

Secretary: Bin Wang (ISO New England)

Outreach Liaison: Farrokh Aminifar (Quanta Technology)

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Scope

- This Task Force will consolidate state-of-the-art methods, success stories, real examples, and industrial practices on locating and mitigating forced oscillations.
- Work scope:
 - Summarize and categorize the approaches for locating FO sources
 - Document industrial practices in monitoring, locating and mitigating FO events.
 - Enrich the existing test cases library with both simulated and real FO event data.
 - Finish a survey paper and the TF report in 2027.

Task Force Meetings

- In-person task force meetings with IEEE PESGMs
- Monthly Zoom meetings: **1st Friday of each month (starting from September 2025) at 1:00 pm EDT**
- Link:
<https://tennessee.zoom.us/j/84436068609>
- Recordings available at the task force YouTube Channel
[@IEEEPESForcedOscillationsTF](https://www.youtube.com/@IEEEPESForcedOscillationsTF)



IEEE PES Forced Oscillations Task Force

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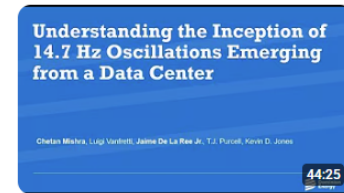
Founded in 2024, the IEEE PES Task Force on Forced Oscillations is sponsored by the IEEE ...more

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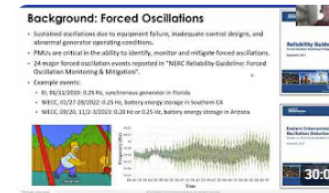
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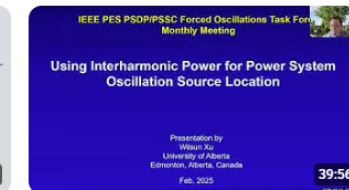
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Task Force Portal

- Portal
 - <https://web.eecs.utk.edu/~kaisun/FOTF/index.html>

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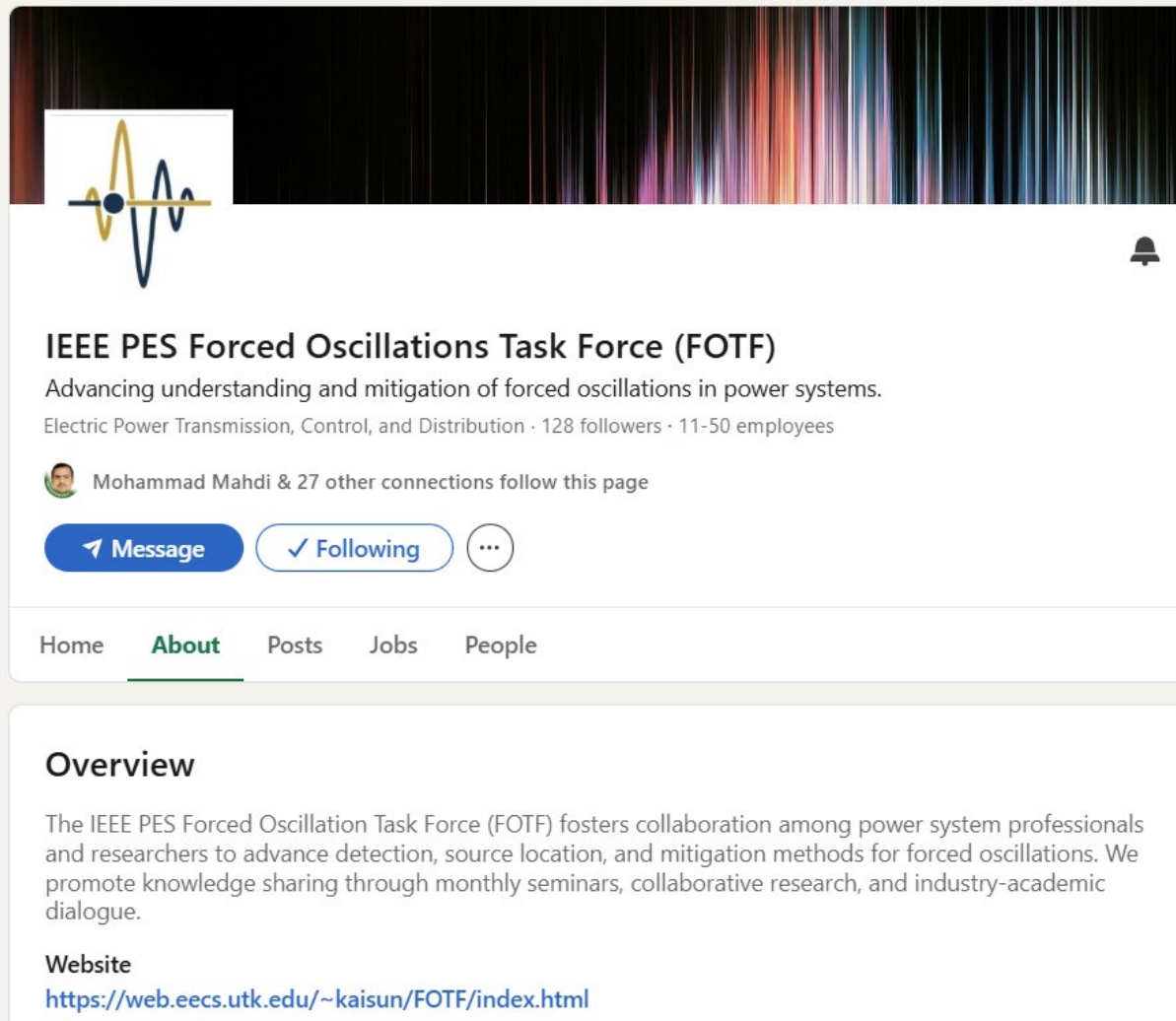
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Background

Grid operators are facing various power system oscillations with the upgrades in generation and transmission and the increasing penetration of inverter-interfaced resources (IBRs). Among all types of oscillations, sustained forced oscillations have posed unique threats to reliable grid operations because, first, they have unpredictable frequencies of a wide spectrum overlapping electromechanical oscillations up to sub-synchronous oscillations, second, they are caused by an unmodeled external source such as a malfunctioning or improperly tuned controller inside the system or an unknown driving force outside of the system, and third, the sources have to be located accurately in order to take an effective mitigation action. The academia and industry have reached a consensus on the differences between forced oscillations and conventional natural oscillations in terms of their mechanisms and mitigation measures.

Task Force LinkedIn Page

- www.linkedin.com/company/ieee-pes-forced-oscillation-task-force



The image shows a screenshot of the LinkedIn profile for the IEEE PES Forced Oscillations Task Force (FOTF). The profile picture is a stylized waveform. The banner image is a colorful, abstract background. The profile name is "IEEE PES Forced Oscillations Task Force (FOTF)". The description is "Advancing understanding and mitigation of forced oscillations in power systems." The industry is "Electric Power Transmission, Control, and Distribution" with 128 followers and 11-50 employees. The page is followed by Mohammad Mahdi and 27 other connections. There are buttons for "Message", "Following", and a menu icon. The "About" tab is selected, showing an overview of the task force's mission and a website link.

IEEE PES Forced Oscillations Task Force (FOTF)
Advancing understanding and mitigation of forced oscillations in power systems.
Electric Power Transmission, Control, and Distribution · 128 followers · 11-50 employees

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Overview

The IEEE PES Forced Oscillation Task Force (FOTF) fosters collaboration among power system professionals and researchers to advance detection, source location, and mitigation methods for forced oscillations. We promote knowledge sharing through monthly seminars, collaborative research, and industry-academic dialogue.

Website
<https://web.eecs.utk.edu/~kaisun/FOTF/index.html>

General Meeting 2025

- Our plan for the next year:
 - Updates on the test cases library (e.g. POW data and real events)
 - TF report (led by Bin Wang)

Task Force Home

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Tools

- ISO New England Oscillation Source Locating Software ([link](#))

Reports

- Oscillation Source Location Task Force, "Forced Oscillations In Power Systems," IEEE Technical Report PES-TR110, 2023 ([link](#))

Websites

- Test Cases Library of Power System Sustained Oscillations ([link](#))
- 2021 IEEE-NASPI Oscillation Source Location Contest ([link](#))

References

1. T. Jiang, B. Liu, B. Wang, G. Liu and X. Li, "Forced Oscillation Source Location in Power Systems Using MVMD-assisted DEF in TF Plane," *IEEE Transactions on Power Systems*, doi: 10.1109/TPWRS.2024.3375310.
2. T. Jiang, B. Liu, G. Liu, B. Wang, X. Li and J. Zhang, "Forced Oscillation Source Location of Bulk Power Systems Using Synchrosqueezing Wavelet Transform," *IEEE Transactions on Power Systems*, vol. 39, no. 5, pp. 6689-6701, Sept. 2024, doi: 10.1109/TPWRS.2024.3351915.
3. J. Xiong, H. Ye, W. Pei, L. Kong, Y. Li and K. Strunz, "Characteristics Analysis of Current-Controlled VSCs for Periodic Forced Oscillations Excited by Grid Frequency Disturbance," *IEEE Transactions on Smart Grid*, vol. 15, no. 1, pp. 545-556, Jan. 2024, doi: 10.1109/TSG.2023.3274785.
4. S. Biswas, J. Follum and J. H. Eto, "Confidence Assessment for Regional Forced Oscillation Source Localization: Formulation and Field Validation," *IEEE Transactions on Power Delivery*, vol. 38, no. 6, pp. 3739-3748, Dec. 2023, doi: 10.1109/TPWRD.2023.3284418.
5. D. Osipov, S. Konstantinopoulos and J. H. Chow, "A Cross-Power Spectral Density Method for Locating Oscillation Sources Using Synchrophasor Measurements," *IEEE Transactions on Power Systems*, vol. 38, no. 6, pp. 5526-5534, Nov. 2023, doi: 10.1109/TPWRS.2022.3229255.
6. P. G. Estevez, P. Marchi, F. Messina and C. Galarza, "Forced Oscillation Identification and Filtering From Multi-Channel Time-Frequency Representation," *IEEE Transactions on Power Systems*, vol. 38, no. 2, pp. 1257-1269, March 2023, doi: 10.1109/TPWRS.2022.3172850.

Presentations in the past year

- Understanding the Inception of 14.7Hz Oscillations Emerging from a Data Center (by Chetan Mishra with Dominion Energy)
- Inverter-Induced Forced Oscillation Source Location Using Synchrophasors (Lin Zhu, EPRI)
- Oscillations Management by Using Point-On-Wave Data (Slava Maslennikov, ISO New England)
- Leveraging Cloud Platforms for Grid Modernization (Daniel Brancaccio, Quanta Technology)
- ERCOT Events and Analysis on Sub-Synchronous Oscillation (SSO) (Yunzhi Cheng, ERCOT)
- An Oscillation Event Analysis Framework Based on Twin-Circuit Theory: Kaua'i 18-20 Hz Case (Shuan Dong, NREL)
- Using Interharmonic Power for Power System Oscillation Source Location (Wilsun Xu, University of Alberta)
- Setting Thresholds for the RMS-Energy Oscillation Detector (Jim Follum, PNNL)
- Locating the Source of Oscillation with Two-Tier Dynamic Mode Decomposition Integrating Early-Stage Energy (Min-Seung Ko, UT Austin)
- Disturbance Source Location Research and Practice in Power Quality Monitoring (Wilsun Xu, University of Alberta)
- Locating Forced Oscillations Sources (Denis Osipov, NYPA)
- A Case Study on Hydro Plant Oscillation Event (Melanie Bennett, University of Tennessee, Knoxville)
- TF introduction (Kai Sun, University of Tennessee, Knoxville)
- Forced Oscillations Causes, Issues, and Mitigation (Dan Trudnowski, Montana Tech)

Takeaways

- Send kaisun@utk.edu an email to join the TF email list.
- Subscribe YouTube Channel @IEEEPESForcedOscillationsTF
- Follow LinkedIn page “IEEE PES Forced Oscillations Task Force”
- Give a talk at a future monthly TF Zoom meeting.
- Contribute to simulated/real oscillation data (phasor/POW) to the test cases library.