

## References

- [1] L. G. Meegahapola, S. Bu, D. P. Wadduwage, C. Y. Chung, and X. Yu, “Review on Oscillatory Stability in Power Grids With Renewable Energy Sources: Monitoring, Analysis, and Control Using Synchrophasor Technology,” *IEEE Trans. Ind. Electron.*, vol. 68, no. 1, pp. 519–531, Jan. 2021. [En linea]. Disponible: <https://ieeexplore.ieee.org/document/8961919/>
- [2] “Eastern Interconnection Oscillation Disturbance January 11, 2019 Forced Oscillation Event,” North American Electric Reliability Coordination (NERC), 2019. [En linea]. Disponible: [https://www.nerc.com/pa/rrm/ea/Documents/January\\_11\\_Oscillation\\_Event\\_Report.pdf](https://www.nerc.com/pa/rrm/ea/Documents/January_11_Oscillation_Event_Report.pdf)
- [3] Y. Chen, Z. Fan, D. Gregory, X. Zhou, and R. Rabbani, “A Survey of Oscillation Localization Techniques in Power Systems,” *IEEE Access*, vol. 13, pp. 28 836–28 860, 2025. [En linea]. Disponible: <https://ieeexplore.ieee.org/document/10879004/>
- [4] H. Yin, D. Cai, and Q. Huang, “A Review of Detection Techniques for Subsynchronous Oscillation in Power Systems,” in *2025 7th Asia Energy and Electrical Engineering Symposium (AEEES)*. Chengdu, China: IEEE, Mar. 2025, pp. 1196–1201. [En linea]. Disponible: <https://ieeexplore.ieee.org/document/11019515/>
- [5] H. Ye, Y. Liu, P. Zhang, and Z. Du, “Analysis and Detection of Forced Oscillation in Power System,” *IEEE Trans. Power Syst.*, pp. 1–1, 2016. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/7491371/>
- [6] W. Ju, I. Dobson, K. Martin, K. Sun, N. Nayak, I. Singh, H. Silva-Saravia, A. Faris, L. Zhang, and Y. Wang, “Real-Time Area Angle Monitoring Using Synchrophasors: A Practical Framework and Utility Deployment,” *IEEE Trans. Smart Grid*, vol. 12, no. 1, pp. 859–870, Jan. 2021. [En linea]. Disponible: <https://ieeexplore.ieee.org/document/9183973/>
- [7] Guoping Liu, Jiawei Ning, Z. Tashman, V. M. Venkatasubramanian, and P. Trachian, “Oscillation Monitoring System using synchrophasors,” in *2012 IEEE Power and Energy Society General Meeting*. San Diego, CA: IEEE, Jul. 2012, pp. 1–8. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/6345444/>
- [8] P. Kundur, N. J. Balu, and M. G. Lauby, *Power system stability and control*, ser. The EPRI power system engineering series. New York: McGraw-Hill, 1994.
- [9] Y. Zhi, “Study of Forced Oscillations and Nonlinear Oscillations in Power Systems,” Ph.D. dissertation, Washington State University, 2020.
- [10] J. D. Follum, F. K. Tuffner, L. A. Dosiek, and J. W. Pierre, “Power System Oscillatory Behaviors: Sources, Characteristics, & Analyses,” Tech. Rep. PNNL–26375, 1411936, May 2017. [En linea]. Disponible: <http://www.osti.gov/servlets/purl/1411936/>
- [11] Ruichao Xie and D. Trudnowski, “Distinguishing features of natural and forced oscillations,” in *2015 IEEE Power & Energy Society General Meeting*. Denver, CO, USA: IEEE, Jul. 2015, pp. 1–5. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/7285781/>
- [12] Lei Chen, Dan Trudnowski, Luke Dosiek, Sukumar Kamalasadan, Yanhui Xu, and Xiaozhe Wang, “Forced Oscillations in Power Systems (TR 110),” publisher: IEEE. [En linea]. Disponible: [https://resourcecenter.ieee-pes.org/publications/technical-reports/pes\\_tp\\_tr110\\_psdp\\_52223](https://resourcecenter.ieee-pes.org/publications/technical-reports/pes_tp_tr110_psdp_52223)



- [13] J. Seppanen, J. Turunen, A.-J. Nikkila, and L. Haarla, “Resonance of Forcing Oscillations and Inter-Area Modes in the Nordic Power System,” in *2018 IEEE PES Innovative Smart Grid Technologies Conference Europe (ISGT-Europe)*. Sarajevo: IEEE, Oct. 2018, pp. 1–6. [En linea]. Disponible: <https://ieeexplore.ieee.org/document/8571482/>
- [14] “Reliability Guideline Forced Oscillation Monitoring & Mitigation,” North American Electric Reliability Coordination (NERC), 2017. [En linea]. Disponible: [https://www.nerc.com/comm/RSTC\\_Reliability\\_Guidelines/Reliability\\_Guideline\\_-\\_Forced\\_Oscillations\\_-\\_2017-07-31\\_-\\_FINAL.pdf](https://www.nerc.com/comm/RSTC_Reliability_Guidelines/Reliability_Guideline_-_Forced_Oscillations_-_2017-07-31_-_FINAL.pdf)
- [15] L. Vanfretti, S. Bengtsson, V. S. Peric, and J. O. Gjerde, “Effects of forced oscillations in power system damping estimation,” in *2012 IEEE International Workshop on Applied Measurements for Power Systems (AMPS) Proceedings*. Aachen, Germany: IEEE, Sep. 2012, pp. 1–6. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/6344015/>
- [16] S. A. Nezam Sarmadi, V. Venkatasubramanian, and A. Salazar, “Analysis of November 29, 2005 Western American Oscillation Event,” *IEEE Trans. Power Syst.*, vol. 31, no. 6, pp. 5210–5211, Nov. 2016. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/7401141/>
- [17] M. Ghorbaniparvar, “Survey on forced oscillations in power system,” *J. Mod. Power Syst. Clean Energy*, vol. 5, no. 5, pp. 671–682, Sep. 2017. [En linea]. Disponible: <http://link.springer.com/10.1007/s40565-017-0273-4>
- [18] N. Hatziaargyriou, J. Milanovic, C. Rahmann, V. Ajjarapu, C. Canizares, I. Erlich, D. Hill, I. Hiskens, I. Kamwa, B. Pal, P. Pourbeik, J. Sanchez-Gasca, A. Stankovic, T. Van Cutsem, V. Vittal, and C. Vournas, “Definition and Classification of Power System Stability – Revisited & Extended,” *IEEE Trans. Power Syst.*, vol. 36, no. 4, pp. 3271–3281, Jul. 2021. [En linea]. Disponible: <https://ieeexplore.ieee.org/document/9286772/>
- [19] S. A. N. Sarmadi and V. Venkatasubramanian, “Inter-Area Resonance in Power Systems From Forced Oscillations,” *IEEE Trans. Power Syst.*, vol. 31, no. 1, pp. 378–386, Jan. 2016. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/7041242/>
- [20] C. D. Vournas, N. Krassas, and B. Papadias, “Analysis of Forced Oscillations in a Multimachine Power System,” 1991.
- [21] J. Follum and J. Pierre, “Time-localization of forced oscillations in power systems,” in *2015 IEEE Power & Energy Society General Meeting*. Denver, CO, USA: IEEE, Jul. 2015, pp. 1–5. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/7286129/>
- [22] U. Agrawal and J. W. Pierre, “Detection of Periodic Forced Oscillations in Power Systems Incorporating Harmonic Information,” *IEEE Trans. Power Syst.*, vol. 34, no. 1, pp. 782–790, Jan. 2019. [En linea]. Disponible: <https://ieeexplore.ieee.org/document/8418863/>
- [23] J. Adams, C. Carter, and S.-H. Huang, “ERCOT experience with Sub-synchronous Control Interaction and proposed remediation,” in *PES T&D 2012*. Orlando, FL, USA: IEEE, May 2012, pp. 1–5. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/6281678/>
- [24] J. Van Ness, “Response of Large Power Systems to Cyclic Load Variations,” *IEEE Trans. on Power Apparatus and Syst.*, vol. PAS-85, no. 7, pp. 723–727, Jul. 1966. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/4073105/>



- [25] N. Rostamkolai, R. Piwko, and A. Matusik, "Evaluation of the impact of a large cyclic load on the LILCO power system using time simulation and frequency domain techniques," *IEEE Trans. Power Syst.*, vol. 9, no. 3, pp. 1411–1416, Aug. 1994. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/336123/>
- [26] K. Rao and L. Jenkins, "Studies on power systems that are subjected to cyclic loads," *IEEE Trans. Power Syst.*, vol. 3, no. 1, pp. 31–37, Feb. 1988. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/43178/>
- [27] J. Pinneilo and J. Van Ness, "Dynamic Response of a Large Power System to a Cyclic Load Produced by a Nuclear Accelerator," *IEEE Trans. on Power Apparatus and Syst.*, vol. PAS-90, no. 4, pp. 1856–1862, Jul. 1971. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/4074535/>
- [28] M. Magdy and F. Coowar, "Frequency domain analysis of power system forced oscillations," *IEE Proc. C Gener. Transm. Distrib. UK*, vol. 137, no. 4, p. 261, 1990. [En linea]. Disponible: <https://digital-library.theiet.org/content/journals/10.1049/ip-c.1990.0035>
- [29] W. Xuanyin, L. Xiaoxiao, and L. Fushang, "Analysis on oscillation in electro-hydraulic regulating system of steam turbine and fault diagnosis based on PSOBP," *Expert Systems with Applications*, vol. 37, no. 5, pp. 3887–3892, May 2010. [En linea]. Disponible: <https://linkinghub.elsevier.com/retrieve/pii/S0957417409009713>
- [30] N. L. Thotakura, C. R. Burge, and Y. Liu, "Impact of the Exciter and Governor Parameters on Forced Oscillations," *Electronics*, vol. 13, no. 16, p. 3177, Aug. 2024. [En linea]. Disponible: <https://www.mdpi.com/2079-9292/13/16/3177>
- [31] P. B. Reddy and I. A. Hiskens, "Limit-induced stable limit cycles in power systems," in *2005 IEEE Russia Power Tech.* St. Petersburg, Russia: IEEE, Jun. 2005, pp. 1–5. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/4524706/>
- [32] Z.-x. Han, Z.-l. Zhu, X.-s. Tian, and F. Li, "Analysis and Simulation Research on Power System Low Frequency Oscillation," in *2010 Second International Conference on Computer Modeling and Simulation.* Sanya, China: IEEE, Jan. 2010, pp. 223–228. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/5421089/>
- [33] Y.-H. Wan, "Synchronized Phasor Data for Analyzing Wind Power Plant Dynamic Behavior and Model Validation," Tech. Rep. NREL/TP-5500-57342, 1067916, Jan. 2013. [En linea]. Disponible: <https://www.osti.gov/servlets/purl/1067916/>
- [34] "Incidente en el Sistema Eléctrico Peninsular Español el 28 de abril de 2025," Red Eléctrica, Spain, Tech. Rep., Jun. 2025.
- [35] D. Bowman, D. Ramasubramanian, R. McCann, E. Farantatos, A. Gaikwad, and J. Caspary, "SPP Grid Strength Study with High Inverter-Based Resource Penetration," in *2019 North American Power Symposium (NAPS).* Wichita, KS, USA: IEEE, Oct. 2019, pp. 1–6. [En linea]. Disponible: <https://ieeexplore.ieee.org/document/9000309/>
- [36] K. Kim, H. Schattler, V. Venkatasubramanian, J. Zaborszky, and P. Hirsch, "Methods for calculating oscillations in large power systems," *IEEE Trans. Power Syst.*, vol. 12, no. 4, pp. 1639–1648, Nov. 1997. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/627870/>



- [37] “Diagnosing Equipment Health and Mis-operations with PMU Data,” North American SynchroPhasor Initiative (NASPI), Tech. Rep., May 2015. [En linea]. Disponible: [https://www.naspi.org/sites/default/files/reference\\_documents/14.pdf?fileID=1530](https://www.naspi.org/sites/default/files/reference_documents/14.pdf?fileID=1530)
- [38] T. Surinkaew, K. Emami, R. Shah, S. Islam, and N. Mithulananthan, “Forced Oscillation in Power Systems With Converter Controlled-Based Resources—A Survey With Case Studies,” *IEEE Access*, vol. 9, pp. 150 911–150 924, 2021. [En linea]. Disponible: <https://ieeexplore.ieee.org/document/9594853/>
- [39] K. Chen, “Wind Farm Oscillation Detection and Mitigation White Paper,” Salt Lake City, UT, USA, Apr. 2014.
- [40] “Interconnection Oscillation Analysis Reliability Assessment,” Electric Reliability Council of Texas, 2019. [En linea]. Disponible: [http://ercot.com/files/docs/2019/10/02/Interconnection\\_Oscillation\\_Analysis\\_NERC.pdf](http://ercot.com/files/docs/2019/10/02/Interconnection_Oscillation_Analysis_NERC.pdf)
- [41] J. R. Taylor, *Classical mechanics*, nachdr. ed. Sausalito, Calif: University Science Books, 2005.
- [42] A. Iskakov and D. Panasetsky, “Estimation of the resonance between forcing and weakly stable oscillations in power systems,” *EPJ Web Conf.*, vol. 217, p. 01005, 2019. [En linea]. Disponible: <https://www.epj-conferences.org/10.1051/epjconf/201921701005>
- [43] I. Dobson, J. Zhang, S. Greene, H. Engdahl, and P. Sauer, “Is strong modal resonance a precursor to power system oscillations?” *IEEE Trans. Circuits Syst. I*, vol. 48, no. 3, pp. 340–349, Mar. 2001. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/915389/>
- [44] E. R. Murillo-Aguirre and A. Román-Messina, “Assessing Modal Resonance in Power Systems Using Pseudo-Spectral Analysis,” *IEEE Access*, vol. 12, pp. 168 456–168 467, 2024. [En linea]. Disponible: <https://ieeexplore.ieee.org/document/10701493/>
- [45] B. Shao, Q. Xiao, L. Wang, P. Han, Z. Bin, C. Wang, F. Blaabjerg, and Z. Chen, “Review on power system generalized modal resonance analysis,” *International Journal of Electrical Power & Energy Systems*, vol. 154, p. 109417, Dec. 2023. [En linea]. Disponible: <https://linkinghub.elsevier.com/retrieve/pii/S014206152300474X>
- [46] I. Dobson and E. Barocio, “Perturbations of weakly resonant power system electromechanical modes,” in *2003 IEEE Bologna Power Tech Conference Proceedings.*, vol. 1. Bologna, Italy: IEEE, 2003, pp. 179–186. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/1304130/>
- [47] A. I. Vistnes, “Forced Oscillations and Resonance,” in *Physics of Oscillations and Waves*. Cham: Springer International Publishing, 2018, pp. 31–57, series Title: Undergraduate Texts in Physics. [En linea]. Disponible: [http://link.springer.com/10.1007/978-3-319-72314-3\\_3](http://link.springer.com/10.1007/978-3-319-72314-3_3)
- [48] M. Donnelly, D. Trudnowski, J. Colwell, J. Pierre, and L. Dosiek, “RMS-energy filter design for real-time oscillation detection,” in *2015 IEEE Power & Energy Society General Meeting*. Denver, CO, USA: IEEE, Jul. 2015, pp. 1–5. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/7286192/>
- [49] D. Kosterev, A. Donahoo, N. Leitschuh, J. Dagle, F. Tuffner, and D. Trudnowski, “Deployment and Initial Experience with Oscillation Detection Application at Bonneville Power Administration,” 2016. [En linea]. Disponible: [https://web.eecs.utk.edu/~kaisun/FOTF/Tutorial\\_2016IEEEPESGM/Synchrophasor\\_11\\_Dmitry.pdf](https://web.eecs.utk.edu/~kaisun/FOTF/Tutorial_2016IEEEPESGM/Synchrophasor_11_Dmitry.pdf)



- [50] J. Follum and J. W. Pierre, “Detection of Periodic Forced Oscillations in Power Systems,” *IEEE Trans. Power Syst.*, vol. 31, no. 3, pp. 2423–2433, May 2016. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/7226879/>
- [51] Ning Zhou, “A coherence method for detecting and analyzing oscillations,” in *2013 IEEE Power & Energy Society General Meeting*. Vancouver, BC: IEEE, 2013, pp. 1–5. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/6672430/>
- [52] N. Zhou and J. Dagle, “Initial Results in Using a Self-Coherence Method for Detecting Sustained Oscillations,” *IEEE Trans. Power Syst.*, vol. 30, no. 1, pp. 522–530, Jan. 2015. [En linea]. Disponible: <http://ieeexplore.ieee.org/document/6818450/>
- [53] “TR-110 Forced Oscillations in Power Systems,” IEEE Power & Energy Society, Technical Report, 2023.
- [54] J. Thambirajah, E. Barocio, and N. Thornhill, “Comparative review of methods for stability monitoring in electrical power systems and vibrating structures,” *IET Gener. Transm. Distrib.*, vol. 4, no. 10, pp. 1086–1103, Oct. 2010. [En linea]. Disponible: <http://digital-library.theiet.org/doi/10.1049/iet-gtd.2009.0485>
- [55] K. Abhinav, P. Rai, A. Prakash, and S. K. Parida, “Comparative Assessment of Prony Analysis and Eigensystem Realization Algorithm for Forced Oscillation Detection and Mode Estimation Considering PMU Noise,” in *2023 IEEE 3rd International Conference on Smart Technologies for Power, Energy and Control (STPEC)*. Bhubaneswar, India: IEEE, Dec. 2023, pp. 1–6. [En linea]. Disponible: <https://ieeexplore.ieee.org/document/10430933/>
- [56] “Recommended Oscillation Analysis for Monitoring and Mitigation Reference Document,” North American Electric Reliability Coordination (NERC), Tech. Rep., Nov. 2021. [En linea]. Disponible: [https://www.nerc.com/comm/RSTC\\_Reliability\\_Guidelines/Oscillation\\_Analysis\\_for\\_Monitoring\\_And\\_Mitigation\\_TRD.pdf](https://www.nerc.com/comm/RSTC_Reliability_Guidelines/Oscillation_Analysis_for_Monitoring_And_Mitigation_TRD.pdf)