REFERENCES

[1] M. Ahmed, U. Amin, S. Aftab, and Z. Ahmed, "Integration of Renewable Energy Resources in Microgrid," Energy and Power Engineering, vol. 07, no. 01, pp. 12–29, 2015.

[2] M. Tanrioven, "Reliability and cost–benefits of adding alternate power sources to an independent micro-grid community," Journal of Power Sources, vol. 150, pp. 136–149, Oct. 2005.

[3] A. Benaboud and A. Rufer, "Gas Turbine: Optimization of Energy Production and High Efficiency by Using Power Electronics," Procedia Engineering, vol. 138, pp. 337–346, 2016.

[4] U. Maqbool and U. A. Khan, "Fault current analysis for grid-connected and Islanded microgrid modes," in 2017 13th International Conference on Emerging Technologies (ICET), Islamabad, 2017, pp. 1–5, doi: 10.1109/ICET.2017.8281734.

[5] F. van Overbeeke, "Fault current source to ensure the fault level in inverter-dominated networks," in CIRED 2009 - 20th International Conference and Exhibition on Electricity Distribution - Part 1, 2009, pp. 1–4.

[6] S. Chatterjee, M. Agarwal, and D. Sen, "The challenges of protection for Microgrid," International Advanced Research Journal in Science, Engineering and Technology, vol. 2, no. 1, 2015.

[7] N. K. Choudhary, S. R. Mohanty, and R. K. Singh, "A review on Microgrid protection," in 2014 International Electrical Engineering Congress (iEECON), Chonburi, Thailand, 2014, pp. 1–4, doi: 10.1109/iEECON.2014.6925919.

[8] C. Buque, S. Chowdhury, and S. P. Chowdhury, "Modelling and simulation of reverse power relay for loss of mains protection of distributed generation in microgrids," in 2013 IEEE Power & Energy Society General Meeting, Vancouver, BC, 2013, pp. 1–5, doi: 10.1109/PESMG.2013.6672601.

[9] P. Crolla, A. J. Roscoe, A. Dysko, and G. M. Burt, "Methodology for testing loss of mains detection algorithms for microgrids and distributed generation using real-time power hardware-in-the-loop based technique," in 8th International Conference on Power Electronics - ECCE Asia, Jeju, Korea (South), 2011, pp. 833–838, doi: 10.1109/ICPE.2011.5944703.

[10] M. A. Uqaili, A. A. Sahito, I. A. Halepoto, Z. A. Memon, and S. B. Dars, "Impact of distributed generation on network short circuit level," in 2014 4th International Conference on Wireless Communications, Vehicular Technology, Information Theory

and Aerospace & Electronic Systems (VITAE), Aalborg, Denmark, 2014, pp. 1–5, doi: 10.1109/VITAE.2014.6934455.

[11] B. J. Brearley and R. R. Prabu, “A review on issues and approaches for microgrid protection,” Renewable and Sustainable Energy Reviews, vol. 67, pp. 988–997, Jan. 2017, doi: 10.1016/j.rser.2016.09.047.

[12] C. A. Plet, M. Graovac, T. C. Green, and R. Iravani, “Fault response of grid-connected inverter dominated networks,” in IEEE PES General Meeting, Minneapolis, MN, 2010, pp. 1–8, doi: 10.1109/PES.2010.5589981.

[13] W. Freitas, J. C. M. Vieira, A. Morelato, L. C. P. daSilva, V. F. da Costa, and F. A. B. Lemos, “Comparative Analysis Between Synchronous and Induction Machines for Distributed Generation Applications,” IEEE Transactions on Power Systems, vol. 21, no. 1, pp. 301–311, Feb. 2006, doi: 10.1109/TPWRS.2005.860931.

[14] M. S. Nazir, Q. Wu, M. Li, and L. Zhang, “Symmetrical Short Circuit Parameter Differences of Double Fed Induction Generator and Synchronous Generator based Wind Turbine,” Indonesian Journal of Electrical Engineering and Computer Science, vol. 6, no. 2, p. 268, May 2017, doi: 10.11591/ijeecs.v6.i2.pp268-277.

[15] H. M. Sharaf, H. H. Zeineldin, D. K. Ibrahim, and E. E.-D. A. EL-Zahab, “A proposed coordination strategy for meshed distribution systems with DG considering user-defined characteristics of directional inverse time overcurrent relays,” International Journal of Electrical Power & Energy Systems, vol. 65, pp. 49–58, Feb. 2015, doi: 10.1016/j.ijepes.2014.09.028.

[16] N. El-Naily, S. M. Saad, T. Hussein, and F. A. Mohamed, “A novel constraint and non-standard characteristics for optimal over-current relays coordination to enhance microgrid protection scheme,” IET Generation, Transmission & Distribution, vol. 13, no. 6, pp. 780–793, Mar. 2019, doi: 10.1049/iet-gtd.2018.5021.

[17] Rockefeller, G. et al., Adaptive Transmission Relaying Concepts for Improved Performance, IEEE Trans. on Power Delivery, 1988.

[18] A. Prasai, Y. Du, A. Paquette, E. Buck, R. G. Harley, and D. Divan, ``Protection of meshed microgrids with communication overlay," in Proc.IEEE Energy Convers. Congr. Expo., Sep. 2010, pp. 64_71.

[19] T. S. Ustun, C. Ozansoy and A. Zayegh, "Modeling of a Centralized Microgrid Protection System and Distributed Energy Resources According to IEC 61850-7-420," in IEEE Transactions on Power Systems, vol. 27, no. 3, pp. 1560-1567, Aug. 2012. doi: 10.1109/TPWRS.2012.2185072

[20] S. Kapil and M. Chawla, “Performance evaluation of k-means clustering algorithm with various distance metrics,” in Proc. IEEE Int. Conf. Power Electron. Intell. Control Energy Syst., 2016, pp. 1–4.

[21] V. V. B. Rao, K. S. Rao, "Computer aided coordination of directional relays: Determination of break points", IEEE Trans. Power Del., vol. 3, no. 2, pp. 545-548, Apr. 1988

[22] L. Jenkines, H. Khincha, S. Shivakumar, P. Dash, "An application of functional dependencies to the topological analysis of protection schemes", IEEE Trans. Power Del., vol. 7, no. 1, pp. 77-83, Jan. 1992.

[23] A. Wadood, T. Khurshaid, S. G. Farkoush, J. Yu, C. Kim, and S. Rhee, “Nature-Inspired Whale Optimization Algorithm for Optimal Coordination of Directional Overcurrent Relays in Power Systems,” Energies, vol. 12, no. 12, p. 2297, Jun. 2019.

[24] H.R.E.H. Bouchekara, M. Zellagui, M.A. Abido, Optimal coordination of directional overcurrent relays using a modified electromagnetic field optimization algorithm, Applied Soft Computing, Volume 54, Pages 267-283, 2017.

[25] P. P. Bedekar and S. R. Bhide, “Optimum coordination of directional overcurrent relays using the hybrid GA-NLP approach,” IEEE Transactions on Power Delivery, vol. 26, no. 1, pp. 109–119, 2011.

[26] T. Amraee, “Coordination of Directional Overcurrent Relays Using Seeker Algorithm,” Power Delivery, IEEE Transactions on, vol. 27, no. 3, pp. 1415–1422, July 2012

[27] M. Singh, B. K. Panigrahi, A. R. Abhyankar, and S. Das, “Optimal coordination of directional over-current relays using informative differential evolution algorithm,” Journal of Computational Science, vol. 5, no. 2, pp. 269–276, Mar. 2014.

[28] D. Birla, R. P. Maheshwari and H. O. Gupta, "A new nonlinear directional overcurrent relay coordination technique, and banes and boons of near-end faults-based approach," in IEEE Transactions on Power Delivery, vol. 21, no. 3, pp. 1176-1182, July 2006.

[29] M. Zellagui and H. Hassan, “A Hybrid Optimization Algorithm (IA-PSO) for Optimal Coordination of Directional Overcurrent Relays in Meshed Power Systems”. WSEAS Transactions on Power Systems. 10. pp 240-250. 2015

[30] M. N. Alam, B. Das, and V. Pant, “An interior point method based protection coordination scheme for directional overcurrent relays in meshed networks,” International Journal of Electrical Power & Energy Systems, vol. 81, pp. 153-164, 2016.

[31] S. H. Mousavi Motlagh and K. Mazlumi, “Optimal Overcurrent Relay Coordination Using Optimized Objective Function,” ISRN Power Engineering, vol. 2014, pp. 1–10, 2014.

[32] T. S. S. Senarathna, M. A. K. S. Boralessa, and K. T. M. Udayanga Hemapala, “Effect of the Different Objective Function Formulations on DOCR Setting Optimization,” in 2019 IEEE R10 Humanitarian Technology Conference (R10-HTC)(47129), Depok, West Java, Indonesia, Nov. 2019, pp. 80–85.

[33] D. Birla, R. P. Maheshwari, H. O. Gupta, K. Deep and M. Thakur, "Application of Random Search Technique in Directional Overcurrent Relay Coordination," International Journal of Emerging Electric Power Systems, vol. 7, no. 1, 8 1 2006.

[34] J. C. Bansal and K. Deep, "Optimization of directional overcurrent relay times by particle swarm optimization," 2008 IEEE Swarm Intelligence Symposium, St. Louis, MO, 2008, pp. 1-7.

[35] K. Deep, N. Barsoum, S. Uatrongjit and P. Vasant, "OPTIMIZATION OF POWER SYSTEMS USING REAL CODED GENETIC ALGORITHMS", AIP Conference Proceedings, 2008.

[36] R. Thangaraj, M. Pant and A. Abraham, "New mutation schemes for differential evolution algorithm and their application to the optimization of directional over-current relay settings," Applied Mathematics and Computation, vol. 216, no. 2, pp. 532-544, 15 3 2010.

[37] R. Thangaraj, M. Pant and K. Deep, "Optimal coordination of over-current relays using modified differential evolution algorithms," *Engineering Applications of Artificial Intelligence,* vol. 23, no. 5, pp. 820-829, 1 8 2010.

[38] M. Barzegari, S. M. T. Bathaee and M. Alizadeh, "Optimal coordination of directional overcurrent relays using harmony search algorithm," 2010 9th International Conference on Environment and Electrical Engineering, Prague, 2010, pp. 321-324.

[39] Dusit Uthitsunthorn and T. Kulworawanichpong, "Optimal overcurrent relay coordination using genetic algorithms," 2010 International Conference on Advances in Energy Engineering, Beijing, 2010, pp. 162-165.

[40] M. Singh, B. Panigrahi and A. Abhyankar, "Optimal coordination of directional over-current relays using Teaching Learning-Based Optimization (TLBO) algorithm," *International Journal of Electrical Power & Energy Systems,* vol. 50, pp. 33-41, 1 9 2013.

[41] N. Ghaffarzadeh and S. Heydari, "Optimal Coordination of Digital Overcurrent Relays using Black Hole Algorithm," 2015.

[42] A. Albasri, Fadhel & Al-Roomi, Ali & Talaq, Jawad. (2015). Optimal Coordination of Directional Overcurrent Relays Using Biogeography-Based Optimization Algorithm. IEEE Transactions on Power Delivery. 30. 1810-1820. 10.1109/TPWRD.2015.2406114.

[43] A. Ahmarinejad, S. M. Hasanpour, M. Babaei and M. Tabrizian, "Optimal Overcurrent Relays Coordination in Microgrid Using Cuckoo Algorithm," *Energy Procedia,* vol. 100, pp. 280-286, 1 11 2016

[44] H. R. E. H. Bouchekara, H. Rafik, E.-H. Bouchekara, M. Zellagui and M. A. Abido, "Coordination of Directional Overcurrent Relays Using the Backtracking Search Algorithm," Journal of Electrical Systems vol: 12 (2) pp: 387-405, 2016.

[45] S. Adhikari and N. Sinha, "Optimal Coordination of Directional Overcurrent Relays Using Bacteria Foraging Algorithm," 2016.

[46] H. Bouchekara, M. Zellagui and M. Abido, "Optimal coordination of directional overcurrent relays using a modified electromagnetic field optimization algorithm," *Applied Soft Computing,* vol. 54, pp. 267-283, 5 2017

[47] M. Sulaiman, Waseem, S. Muhammad and A. Khan, "Improved Solutions for the Optimal Coordination of DOCRs Using Firefly Algorithm", Complexity, vol. 2018, pp. 1-15, 2018.

[48] Kim, C.H.; Khurshaid, T.; Wadood, A.; Farkoush, S.G.; Rhee, S.B. Gray Wolf Optimizer for the Optimal Coordination of Directional Overcurrent Relay. J. Electr. Eng. Technol. 2018, 13, 1043–1051.

[49] A. Wadood, S. Gholami Farkoush, T. Khurshaid, C.-H. Kim, J. Yu, Z. W. Geem and S.-B. Rhee, "An Optimized Protection Coordination Scheme for the Optimal Coordination of Overcurrent Relays Using a Nature-Inspired Root Tree Algorithm," *Applied Sciences,* vol. 8, no. 9, p. 1664, 15 9 2018.

[50] A. A. El-Fergany and H. M. Hasanien, "Water cycle algorithm for optimal overcurrent relays coordination in electric power systems," *Soft Computing,* pp. 1-18, 12 2 2019.

[51] G. Darji, A. Patel and R. Mehta, "Optimal Coordination of Directional Overcurrent Relays Using AI Algorithms and Comparison“, International Conference on Research and Innovations in Science, Volume 1, 2017, Pages 81-89

[52] R. Jalilzadeh Hamidi, A. Ahmadian, R. Patil and A. Asadinejad, "Optimal time-current graded coordination of multistage inverse-time overcurrent relays in distribution networks", International Transactions on Electrical Energy Systems, p. e2841, 2019

[53] Xin-She Yang, Chapter 14 - Multi-Objective Optimization, Editor(s): Xin-She Yang, Nature-Inspired Optimization Algorithms, Elsevier, 2014, Pages 197-211, ISBN 9780124167438.

[54] E. H. Gutierrez, A. Conde, M. Y. Shih, and E. Fernández, "Execution time enhancement of DOCR coordination algorithms for on-line application," Electric Power Systems Research, vol. 170, pp. 1–12, May 2019, doi: 10.1016/j.epsr.2019.01.004.

[55] M. Sulaiman, A. Ahmad, A. Khan and S. Muhammad, "Hybridized Symbiotic Organism Search Algorithm for the Optimal Operation of Directional Overcurrent Relays", Complexity, vol. 2018, pp. 1-11, 2018.

[56] T. Chelliah, R. Thangaraj, S. Allamsetty and M. Pant, "Coordination of directional overcurrent relays using opposition based chaotic differential evolution algorithm", International Journal of Electrical Power & Energy Systems, vol. 55, pp. 341-350, 2014.

[57] University of Washington, "Power systems test case archive," Seattle, WA, USA, Aug. 1993. [Online]. Available: http://labs.ece.uw.edu/pstca/ pf14/pg_tca14bus.htm

[58] T. N. Boutsika and S. A. Papathanassiou, "Short-circuit calculations in networks with distributed generation," Electric Power Systems Research, vol. 78, no. 7, pp. 1181–1191, Jul. 2008, doi: 10.1016/j.epsr.2007.10.003.

[59] M. Ezzeddine, R. Kaczmarek, and M. U. Iftikhar, "Coordination of directional overcurrent relays using a novel method to select their settings," *IET Gener. Transm. Distrib.*, vol. 5, no. 7, p. 743, 2011.

[60] J. M. Gers and E. J. Holmes, Protection of Electricity Distribution Networks, 2nd ed., ser. IEE Power & Energy Series 47. London, UK: Institution of Engineering and Technology, 2004.

[61] K. Masuda, K. Kurihara and E. Aiyoshi, "A penalty approach to handle inequality constraints in particle swarm optimization," 2010 IEEE International Conference on Systems, Man and Cybernetics, Istanbul, 2010, pp. 2520-2525.

[62] A. Sadollah, A. Bahreininejad, H. Eskandar, and M. Hamdi, "Mine blast algorithm: A new population-based algorithm for solving constrained engineering optimization problems," Applied Soft Computing, vol. 13, no. 5, pp. 2592–2612, May 2013.

[63] H. Eskandar, A. Sadollah, A. Bahreininejad, and M. Hamdi, “Water cycle algorithm – A novel metaheuristic optimization method for solving constrained engineering optimization problems,” Computers & Structures, vol. 110–111, pp. 151–166, Nov. 2012.

[64] S. Mirjalili and A. Lewis, “The Whale Optimization Algorithm,” Advances in Engineering Software, vol. 95, pp. 51–67, May 2016.

[65] S. Mirjalili, “SCA: A Sine Cosine Algorithm for solving optimization problems,” Knowledge-Based Systems, vol. 96, pp. 120–133, Mar. 2016.

[66] A. Lewis, and S. Mirjalili, “Grey Wolf Optimizer,” Advances in Engineering Software, vol. 69, pp. 46–61, Mar. 2014.

[67] A. Sadollah, H. Sayyaadi, and A. Yadav, “A dynamic metaheuristic optimization model inspired by biological nervous systems: Neural network algorithm,” Applied Soft Computing, vol. 71, pp. 747–782, Oct. 2018.

[68] S. Z. M. Hashim and S. Mirjalili , “A new hybrid PSOGSA algorithm for function optimization,” in 2010 International Conference on Computer and Information Application, Tianjin, China, 2010, pp. 374–377.

[69] N. Singh and S. B. Singh, “Hybrid Algorithm of Particle Swarm Optimization and Grey Wolf Optimizer for Improving Convergence Performance,” Journal of Applied Mathematics, vol. 2017, pp. 1–15, 2017.

[70] S. Khalilpourazari and S. Khalilpourazary, “An efficient hybrid algorithm based on Water Cycle and Moth-Flame Optimization algorithms for solving numerical and constrained engineering optimization problems,” Soft Comput, vol. 23, no. 5, pp. 1699–1722, Mar. 2019.