OPTIMAL DISTRIBUTED GENERATION AND LOAD SHEDDING SCHEME USING ARTIFICIAL BEE COLONY- HILL CLIMBING ALGORITHM CONSIDERING VOLTAGE STABILITY AND LOSSES INDICES

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I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Doctor of Philosophy

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I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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ABSTRAK

Peningkatan penggunaan kuasa boleh menjurus kepada pelbagai masalah serius dalam sistem kuasa elektrik, seperti ketidakstabilan voltan, ketidakstabilan frekuensi, beban lebih talian, dan bekalan sistem kuasa terputus. Gangguan kuasa boleh meningkat kerana kesesakan dalam sistem penghantaran. Situasi ini telah mendorong sebilangan besar pengendali sistem kuasa untuk menjalankan operasi mereka hampir kepada had kestabilan voltan. Indeks Kestabilan Voltan (VSI) merupakan suatu teknik untuk mengenal pasti sebarang masalah berkaitan kestabilan voltan. Oleh itu, kajian ini mencadangkan satu indeks had kestabilan voltan talian berdasarkan Teorem Thevenin yang dinamakan Indeks Kestabilan Talian Maksimum (MLSI). Fungsi MLSI untuk menganggar keadaan kestabilan sistem kuasa dan mengenal pasti talian penghantaran yang sensitif telah diuji pada sebilangan sistem ujian piawaian IEEE. Pemampas atau sumber tenaga boleh diperbaharui telah disepadukan dengan rangkaian sistem kuasa sedia ada untuk meningkatkan kemampuannya dan memperbaiki kualiti kuasa keseluruhan rangkaian. Kajian ini turut memberi tumpuan kepada usaha mempertingkatkan kestabilan dalam sistem kuasa. Jika sesuatu sistem perlu berada dalam keadaan stabil, ia mestilah mempunyai jidar keupayaan beban yang mencukupi sekiranya berlaku peningkatan permintaan kuasa secara mendadak. Bagi mengurangkan beban terhadap talian penghantaran yang lemah atau sensitif akibat keadaan kontingensi, penggunaan unit penjana teragih (DG) dikaji sebagai suatu pilihan penyelesaian kepada masalah ini. Penyelesaian yang dicadangkan ini adalah berasaskan kuasa aktif yang optimum dari unit DG dalam keadaan kontingensi. Kaedah pengoptimuman yang dicadangkan ini telah dibangunkan daripada gabungan algoritma Koloni Lebah Buatan dan Pendakian Bukit (ABC-HC) dan keberkesanannya telah disahkan menggunakan sistem ujian IEEE yang sama. Dalam keadaan kontingensi yang lebih serius, seperti peningkatan permintaan dan kegagalan talian penghantaran, kesesakan tidak dapat diatasi dengan pengurangan generasi DG. Pilihan penyelesaian yang seterusnya adalah penyisihan beban untuk mengurangkan kesesakan di dalam sistem untuk mengekalkan kestabilan voltan. Untuk menyelesaikan masalah ini, pendekatan penyisihan beban yang optimum yang disepadukan dengan pensaizan DG yang optimum telah dilaksanakan menggunakan algoritma ABC-HC. Teknik ini mampu mengenal pasti lokasi beban yang terbaik untuk disisihkan, serta saiz PT. Hasil simulasi menunjukkan bahawa suntikan tenaga aktif optimum daripada DG telah meningkatkan indeks kestabilan voltan, dengan pengurangan kehilangan kuasa yang nyata. Hasil prestasi simulasi yang diuji menggunakan sistem ujian IEEE menyokong keberkesanan kaedah yang dicadangkan, dengan peningkatan yang besar dalam margin kestabilan voltan. Oleh itu, pemasangan DG dan penyisihan beban mampu menyokong sistem elektrik sebelum, semasa, dan setelah gangguan elektrik berlaku.

ABSTRACT

Around the world, the demand is increasing due to industrial activity and advances in both developing and developed countries. This situation has pushed many power system operators to operate their system closer to the voltage stability limits. Increase in power consumption can cause serious problems in electric power systems, such as voltage instability, frequency instability, line overloading, and power system blackouts.Voltage stability index (VSI) is a tool for detecting voltage stability related problems. This work proposes an index of the line voltage stability limits based on Thevenin's Theorem, which is referred to as the Maximum Line Stability Index (MLSI). The function of MLSI is to estimate the voltage stability condition and determine sensitive lines in power system. To increase voltage stability and improve other aspects of power quality, many power system operators are considering the idea of integrating distributed energy resources into the existing power system. Another part of this work focuses on enhancing the stability of the power system using distributed generator (DG). The proposed solution is based on the optimization method developed from a combination of the Artificial Bee Colony and Hill Climbing algorithms (ABC-HC) to give the optimal placement and sizing of DG units to be deployed in the system. Under severe contingency conditions, such as increase in demand and loss of transmission lines, frequently the problem cannot be solved by just using the DG, the possible solution is to consider load shedding as to reduce the congestion in order to maintain voltage stability in the system. To solve this problem, an optimal load shedding approach, integrated with optimal DG sizing is proposed using the ABC-HC algorithm. This technique can find the load location to be shed, as well as the size of DG. The performance and effectiveness of each proposed solution was tested on IEEE test systems. The simulation results showed that the MLSI index has strong sensitivity to detect the overloaded line in the system and as reliable as other voltage stability indices. Meanwhile, the proposed ABC-HC optimization technique shows its ability to identify the bus location and the optimal active energy injection from the DG with a substantial power loss reduction. Finally, under severe contingency condition, the optimization of DGs and load shedding shows the system able to maintain its voltage stability.

TABLE OF CONTENT

REFERENCES

Abdelaziz, A. Y., Hegazy, Y. G., El-Khattam, W., Othman, M. M. J. E. P. C. and Systems. (2015). A multi-objective optimization for sizing and placement of voltage-controlled distributed generation using supervised big bang–big crunch method. *43*(1), 105-117.

Abdmouleh, Z., Gastli, A., Ben-Brahim, L., Haouari, M. and Al-Emadi, N. A. J. R. E. (2017). Review of optimization techniques applied for the integration of distributed generation from renewable energy sources. *113*, 266-280.

Abu-Mouti, F. and El-Hawary, M. (2011a). Heuristic curve-fitted technique for distributed generation optimisation in radial distribution feeder systems. *IET Generation, Transmission & Distribution, 5*(2), 172-180.

Abu-Mouti, F. S. and El-Hawary, M. (2011b). Optimal distributed generation allocation and sizing in distribution systems via artificial bee colony algorithm. *IEEE transactions on power delivery, 26*(4), 2090-2101.

Abu-Mouti, F. S. and El-Hawary, M. J. I. t. o. p. d. (2011c). Optimal distributed generation allocation and sizing in distribution systems via artificial bee colony algorithm. *26*(4), 2090-2101.

Acharya, N., Mahat, P. and Mithulananthan, N. (2006). An analytical approach for DG allocation in primary distribution network. *International Journal of Electrical Power & Energy Systems, 28*(10), 669-678.

Akagi, H., Watanabe, E. H. and Aredes, M. (2017). *Instantaneous power theory and applications to power conditioning*: John Wiley & Sons.

Akorede, M. F., Hizam, H., Aris, I. and Ab Kadir, M. (2011). Effective method for optimal allocation of distributed generation units in meshed electric power systems. *IET Generation, Transmission & Distribution, 5*(2), 276-287.

Al Abri, R., El-Saadany, E. F. and Atwa, Y. M. (2012). Optimal placement and sizing method to improve the voltage stability margin in a distribution system using distributed generation. *IEEE transactions on power systems, 28*(1), 326-334.

Albuquerque, M. A. and Castro, C. A. (2003). *A contingency ranking method for voltage stability in real time operation of power systems. Paper presented at the 2003 IEEE Bologna Power Tech Conference Proceedings.Journal, 1*, 5 pp. Vol. 1.

AlHajri, M., AlRashidi, M. and El-Hawary, M. (2010). Improved sequential quadratic programming approach for optimal distribution generation deployments via stability and sensitivity analyses. *Electric Power Components and Systems, 38*(14), 1595-1614.

Alipour, A., Asis, C. A. C., Avanzado, J. J. P. and Pacis, M. C. (2016). *Study in the impact of Distributed Generator (DG) placement and sizing on a ring distribution network. Paper presented at the Region 10 Conference (TENCON), 2016 IEEE.Journal*, 1198-1203.

Althowibi, F. and Mustafa, M. (2010). *Line voltage stability calculations in power systems. Paper presented at the 2010 IEEE International Conference on Power and Energy*.*Journal*, 396-401.

Arya, L., Koshti, A. and Choube, S. (2012). Distributed generation planning using differential evolution accounting voltage stability consideration. *International Journal of Electrical Power & Energy Systems, 42*(1), 196-207.

ARYA, Y. (2017). *Some Studies On Automatic Generation Control Of Multi-Area Interconnected Restructured Power Systems.*

Atwa, Y., El-Saadany, E., Salama, M. and Seethapathy, R. (2009). Optimal renewable resources mix for distribution system energy loss minimization. *IEEE transactions on power systems, 25*(1), 360-370.

Atwa, Y. M. and El-Saadany, E. F. (2011). Probabilistic approach for optimal allocation of wind-based distributed generation in distribution systems. *IET Renewable Power Generation, 5*(1), 79-88.

Ayres, R. (2016). The New World: And Science *Energy, Complexity and Wealth Maximization* (pp. 255-301): Springer.

Baghaee, H. R., Mirsalim, M., Gharehpetian, G. B., Talebi, H. A. J. S. M. P. and Theory. (2017). Application of RBF neural networks and unscented transformation in probabilistic power-flow of microgrids including correlated wind/PV units and plug-in hybrid electric vehicles. *72*, 51-68.

Banerjee, B. and Islam, S. M. (2011). Reliability based optimum location of distributed generation. *International Journal of Electrical Power & Energy Systems, 33*(8), 1470-1478.

Barani, M., Aghaei, J., Akbari, M. A., Niknam, T., Farahmand, H. and Korpås, M. J. I. T. o. S. G. (2018). Optimal partitioning of smart distribution systems into supply-sufficient microgrids. *10*(3), 2523-2533.

Barthélemy, J. and Marx, M. (2018). Solving Rational Expectations Models *The Oxford Handbook of Computational Economics and Finance*: Oxford University Press.

Barton, J. P. and Infield, D. G. (2004). Energy storage and its use with intermittent renewable energy. *IEEE Transactions on Energy conversion, 19*(2), 441-448.

Behera, S. (2015). *Study of Voltage Stability Using Intelligent Techniques.*

Behera, S., Sahoo, S., Pati, B. J. R. and Reviews, S. E. (2015). A review on optimization algorithms and application to wind energy integration to grid. *48*, 214-227.

Blaabjerg, F., Yang, Y., Yang, D. and Wang, X. J. P. o. t. I. (2017). Distributed power-generation systems and protection. *105*(7), 1311-1331.

Borges, C. L. and Falcao, D. M. (2006). Optimal distributed generation allocation for reliability, losses, and voltage improvement. *International Journal of Electrical Power & Energy Systems, 28*(6), 413-420.

Bouzid, A. M., Guerrero, J. M., Cheriti, A., Bouhamida, M., Sicard, P., Benghanem, M. J. R. and Reviews, S. E. (2015). A survey on control of electric power distributed generation systems for microgrid applications. *44*, 751-766.

Canizares, C. A., De Souza, A. C. and Quintana, V. H. (1996). Comparison of performance indices for detection of proximity to voltage collapse. *IEEE transactions on power systems, 11*(3), 1441-1450.

Carpinelli, G., Celli, G., Mocci, S., Pilo, F. and Russo, A. (2005). Optimisation of embedded generation sizing and siting by using a double trade-off method. *IEE Proceedings-Generation, Transmission and Distribution, 152*(4), 503-513.

Carpinelli, G., Celli, G., Pilo, F. and Russo, A. (2003). Embedded generation planning under uncertainty including power quality issues. *European transactions on electrical power, 13*(6), 381-389.

Celli, G., Ghiani, E., Mocci, S. and Pilo, F. (2005). A multiobjective evolutionary algorithm for the sizing and siting of distributed generation. *IEEE transactions on power systems, 20*(2), 750-757.

Chattopadhyay, T. K., Banerjee, S. and Chanda, C. K. (2014). *Impact of distributed generator on voltage stability analysis of distribution networks under critical loading conditions. Paper presented at the 2014 1st International Conference on Non Conventional Energy (ICONCE 2014).Journal*, 288-291.

Chebbo, A., Irving, M. and Sterling, M. (1992a). *Reactive power dispatch incorporating voltage stability. Paper presented at the IEE Proceedings C (Generation, Transmission and Distribution).Journal, 139*(3), 253-260.

Chebbo, A., Irving, M. and Sterling, M. (1992b). *Voltage collapse proximity indicator: behaviour and implications. Paper presented at the IEE Proceedings C (Generation, Transmission and Distribution).Journal, 139*(3), 241-252.

Cherry, D. D. (2012). *Optimal placement of distributed generation on a power system using particle swarm optimization.* Mississippi State University.

Cholley, P., Crossley, P., Van Acker, V., Van Cutsem, T., Fu, W., Soto Idia Òez, J., . . . McCalley, J. (2001). System protection schemes in power networks. *CIGRE Technical Brochure*.

Costa, P. M. and Matos, M. A. (2009). Avoided losses on LV networks as a result of microgeneration. *Electric power systems research, 79*(4), 629-634.

Cui, Y., Geng, Z., Zhu, Q. and Han, Y. J. E. (2017). Multi-objective optimization methods and application in energy saving. *125*, 681-704.

Danish, M. S. S. (2015). *Voltage Stability in Electric Power System: A Practical Introduction*: Logos Verlag Berlin GmbH.

Das, C. K., Bass, O., Kothapalli, G., Mahmoud, T. S., Habibi, D. J. R. and Reviews, S. E. (2018). Overview of energy storage systems in distribution networks: Placement, sizing, operation, and power quality. *91*, 1205-1230.

Deng, P., Sun, Y. and Xu, J. (2009). *A new index of voltage stability considering distribution network. Paper presented at the 2009 Asia-Pacific Power and Energy Engineering Conference.Journal*, 1-4.

Dent, C. J., Ochoa, L. F. and Harrison, G. P. (2010). Network distributed generation capacity analysis using OPF with voltage step constraints. *IEEE transactions on power systems, 25*(1), 296-304.

Derafshian, M., Amjady, N. and Dehghan, S. (2016). Special protection scheme against voltage collapse. *IET Generation, Transmission & Distribution, 10*(2), 341-351.

Di Florio, G. (2015). Innovative Model Of Product Certification Within The Energy Deregulated Market. Example Of Application To A Smart Energy Area In The Sector Of Local Transport Service.

El-Ela, A. A., Allam, S. M. and Shatla, M. (2010). Maximal optimal benefits of distributed generation using genetic algorithms. *Electric power systems research, 80*(7), 869-877.

El-Khattam, W., Bhattacharya, K., Hegazy, Y. and Salama, M. (2004). Optimal investment planning for distributed generation in a competitive electricity market. *IEEE transactions on power systems, 19*(3), 1674-1684.

El-Khattam, W., Hegazy, Y. and Salama, M. (2005). An integrated distributed generation optimization model for distribution system planning. *IEEE transactions on power systems, 20*(2), 1158-1165.

El-Sadek, M. (2004). Power System Control. *Book, Muchtar press-Egypt*.

El-Zonkoly, A. (2011). Optimal placement of multi-distributed generation units including different load models using particle swarm optimization. *Swarm and Evolutionary Computation, 1*(1), 50-59.

Eminoglu, U. and Hocaoglu, M. (2007). *A voltage stability index for radial distribution networks. Paper presented at the 2007 42nd International Universities Power Engineering Conference.Journal*, 408-413.

Expósito, A. G., Gomez-Exposito, A., Conejo, A. J. and Canizares, C. (2016). *Electric energy systems: analysis and operation*: CRC Press.

Flynn, D., Rather, Z., Ardal, A., D'Arco, S., Hansen, A. D., Cutululis, N. A., . . . Environment. (2017). Technical impacts of high penetration levels of wind power on power system stability. *6*(2), e216.

Gamarra, C., Guerrero, J. M. J. R. and Reviews, S. E. (2015). Computational optimization techniques applied to microgrids planning: A review. *48*, 413-424.

Gandomkar, M., Vakilian, M. and Ehsan, M. (2005). A genetic–based tabu search algorithm for optimal DG allocation in distribution networks. *Electric Power Components and Systems, 33*(12), 1351-1362.

Gao, F., Bozhko, S., Costabeber, A., Asher, G. and Wheeler, P. J. I. T. o. I. E. (2017). Control design and voltage stability analysis of a droop-controlled electrical power system for more electric aircraft. *64*(12), 9271-9281.

Gao, H., Chen, Y., Xu, Y. and Liu, C.-C. J. I. T. o. S. G. (2016). Resilience-oriented critical load restoration using microgrids in distribution systems. *7*(6), 2837-2848.

Gautam, D. and Mithulananthan, N. (2007). Optimal DG placement in deregulated electricity market. *Electric power systems research, 77*(12), 1627-1636.

Ghosh, S., Ghoshal, S. P. and Ghosh, S. (2010). Optimal sizing and placement of distributed generation in a network system. *International Journal of Electrical Power & Energy Systems, 32*(8), 849-856.

Giraldo Chavarriaga, J. S. (2015). Robust and efficient voltage stability margin computation using synchrophasors: Cálculo robusto e eficiente da margem de estabilidade de tensão usando sincrofasores.

Glisson Jr, T. H. (2011). Complex Power *Introduction to Circuit Analysis and Design* (pp. 479-520): Springer.

Golshan, M. E. H. and Ali Arefifar, S. (2007). Optimal allocation of distributed generation and reactive sources considering tap positions of voltage regulators as control variables. *European transactions on electrical power, 17*(3), 219-239.

Gomez-Exposito, A., Conejo, A. J. and Canizares, C. (2018). *Electric energy systems: analysis and operation*: CRC press.

Gomez-Gonzalez, M., López, A. and Jurado, F. (2012). Optimization of distributed generation systems using a new discrete PSO and OPF. *Electric power systems research, 84*(1), 174-180.

Gong, Y., Schulz, N. and Guzman, A. (2006). *Synchrophasor-based real-time voltage stability index. Paper presented at the 2006 IEEE PES Power Systems Conference and Exposition.Journal*, 1029-1036.

Gözel, T. and Hocaoglu, M. H. (2009). An analytical method for the sizing and siting of distributed generators in radial systems. *Electric power systems research, 79*(6), 912-918.

HA, M. P., Huy, P. D., Ramachandaramurthy, V. K. J. R. and Reviews, S. E. (2017). A review of the optimal allocation of distributed generation: Objectives, constraints, methods, and algorithms. *75*, 293-312.

Haesen, E., Driesen, J. and Belmans, R. (2007). Robust planning methodology for integration of stochastic generators in distribution grids. *IET Renewable Power Generation, 1*(1), 25-32.

Haghifam, M.-R., Falaghi, H. and Malik, O. (2008). Risk-based distributed generation placement. *IET Generation, Transmission & Distribution, 2*(2), 252-260.

Hajivand, M., Karimi, R., Karimi, M. J. I. J. o. I., Security and Management, S. (2014). Optimal recloser placement by binary differential evolutionary algorithm to improve reliability of distribution system. *3*(2), 345-349.

Hamedi, H. and Gandomkar, M. (2012). A straightforward approach to minimizing unsupplied energy and power loss through DG placement and evaluating power quality in relation to load variations over time. *International Journal of Electrical Power & Energy Systems, 35*(1), 93-96.

Haque, M. (2007). *Use of local information to determine the distance to voltage collapse. Paper presented at the 2007 International Power Engineering Conference (IPEC 2007).Journal*, 407-412.

Harrison, G. and Wallace, A. (2005). Optimal power flow evaluation of distribution network capacity for the connection of distributed generation. *IEE Proceedings-Generation, Transmission and Distribution, 152*(1), 115-122.

Harrison, G. P., Piccolo, A., Siano, P. and Wallace, A. R. (2008). Hybrid GA and OPF evaluation of network capacity for distributed generation connections. *Electric power systems research, 78*(3), 392-398.

He, T., Kolluri, S., Mandal, S., Galvan, F. and Rasigoufard, P. (2004). *Identification of weak locations in bulk transmission systems using voltage stability margin index. Paper presented at the IEEE Power Engineering Society General Meeting, 2004.Journal*, 1814-1819.

Hedayati, H., Nabaviniaki, S., Akbarimajd and Akbarimajd, A. (2008). A method for placement of DG units in distribution networks. *IEEE transactions on power delivery, 23*(3), 1620-1628.

Hemdan, N. G. and Kurrat, M. (2011). Efficient integration of distributed generation for meeting the increased load demand. *International Journal of Electrical Power & Energy Systems, 33*(9), 1572-1583.

Howell, S., Rezgui, Y., Hippolyte, J.-L., Jayan, B., Li, H. J. R. and Reviews, S. E. (2017). Towards the next generation of smart grids: Semantic and holonic multi-agent management of distributed energy resources. *77*, 193-214.

Hung, D. Q. and Mithulananthan, N. (2011). Multiple distributed generator placement in primary distribution networks for loss reduction. *IEEE Transactions on Industrial Electronics, 60*(4), 1700-1708.

Hung, D. Q., Mithulananthan, N. and Bansal, R. (2010). Analytical expressions for DG allocation in primary distribution networks. *IEEE Transactions on Energy conversion, 25*(3), 814-820.

Hussain, S. and Kim, Y.-C. (2016). *Fault resilient communication network architecture for monitoring and control of wind power farms. Paper presented at the Advanced Communication Technology (ICACT), 2016 18th International Conference on.Journal*, 685-692.

Jabr, R. and Pal, B. (2009). Ordinal optimisation approach for locating and sizing of distributed generation. *IET Generation, Transmission & Distribution, 3*(8), 713-723.

Jain, S., Kalambe, S., Agnihotri, G., Mishra, A. J. R. and Reviews, S. E. (2017). Distributed generation deployment: State-of-the-art of distribution system planning in sustainable era. *77*, 363-385.

Johnson, S. P. and Aslin, R. N. (1995). Perception of object unity in 2-month-old infants. *Developmental Psychology, 31*(5), 739.

Kanimozhi, R. and Selvi, K. (2013). A novel line stability index for voltage stability analysis and contingency ranking in power system using fuzzy based load flow. *Journal of Electrical Engineering & Technology (JEET), 8*(4), 694-703.

Karbalaei, F., Soleymani, H. and Afsharnia, S. (2010). *A comparison of voltage collapse proximity indicators. Paper presented at the IPEC, 2010 Conference Proceedings.Journal*, 429-432.

Kaur, P., Kaur, S. and Khanna, R. (2016). *Optimal placement and sizing of DG comparison of different techniques of DG placement. Paper presented at the Power Electronics, Intelligent Control and Energy Systems (ICPEICES), IEEE International Conference on.Journal*, 1-4.

Keane, A. and O'Malley, M. (2005). Optimal allocation of embedded generation on distribution networks. *IEEE transactions on power systems, 20*(3), 1640-1646.

Keane, A. and O'Malley, M. (2007). Optimal utilization of distribution networks for energy harvesting. *IEEE transactions on power systems, 22*(1), 467-475.

Kefayat, M., Ara, A. L., Niaki, S. N. J. E. C. and Management. (2015). A hybrid of ant colony optimization and artificial bee colony algorithm for probabilistic optimal placement and sizing of distributed energy resources. *92*, 149-161.

Kenari, M. T., Sepasian, M. S., Nazar, M. S. J. I. J. o. E. P. and Systems, E. (2018). Probabilistic voltage stability assessment of distribution networks with wind generation using combined cumulants and maximum entropy method. *95*, 96-107.

Kessel, P. and Glavitsch, H. (1986). Estimating the voltage stability of a power system. *IEEE transactions on power delivery, 1*(3), 346-354.

Khalesi, N., Rezaei, N. and Haghifam, M.-R. (2011). DG allocation with application of dynamic programming for loss reduction and reliability improvement. *International Journal of Electrical Power & Energy Systems, 33*(2), 288-295.

Khan, H. and Choudhry, M. A. (2010). Implementation of Distributed Generation (IDG) algorithm for performance enhancement of distribution feeder under extreme load growth. *International Journal of Electrical Power & Energy Systems, 32*(9), 985-997.

Khederzadeh, M. (2012). Smart grids facilitate the implementation of sophisticated system protection schemes (SPS).

Khodr, H., Silva, M. R., Vale, Z. and Ramos, C. (2010). A probabilistic methodology for distributed generation location in isolated electrical service area. *Electric power systems research, 80*(4), 390-399.

Kim, J., Nam, S., Park, S. and Singh, C. (1998). Dispersed generation planning using improved Hereford ranch algorithm. *Electric power systems research, 47*(1), 47-55.

Kim, K.-H., Lee, Y.-J., Rhee, S.-B., Lee, S.-K. and You, S.-K. (2002). *Dispersed generator placement using fuzzy-GA in distribution systems. Paper presented at the IEEE Power Engineering Society Summer Meeting.Journal, 3*, 1148-1153.

Kim, K. H., Song, K. B., Joo, S. K., Lee, Y. J. and Kim, J. O. (2008). Multiobjective distributed generation placement using fuzzy goal programming with genetic algorithm. *European transactions on electrical power, 18*(3), 217-230.

Kirschen, D. S. and Strbac, G. (2018). *Fundamentals of power system economics*: John Wiley & Sons.

Kong, T., Jia, M. and Sun, G. (2016). *Application of bacterial foraging algorithm for fault location in distribution networks with DG. Paper presented at the Electricity Distribution (CICED), 2016 China International Conference on.Journal*, 1-4.

Kotamarty, S., Khushalani, S. and Schulz, N. (2008). Impact of distributed generation on distribution contingency analysis. *Electric power systems research, 78*(9), 1537-1545.

Koutroumpezis, G. and Safigianni, A. (2010). Optimum allocation of the maximum possible distributed generation penetration in a distribution network. *Electric power systems research, 80*(12), 1421-1427.

Krishnan, V., Ho, J., Hobbs, B. F., Liu, A. L., McCalley, J. D., Shahidehpour, M. and Zheng, Q. P. J. E. S. (2016). Co-optimization of electricity transmission and generation resources for planning and policy analysis: review of concepts and modeling approaches. *7*(2), 297-332.

Kroposki, B., Pink, C., DeBlasio, R., Thomas, H., Simoes, M. and Sen, P. K. (2010). Benefits of power electronic interfaces for distributed energy systems. *IEEE Transactions on Energy conversion, 25*(3), 901-908.

Kumar, A. and Gao, W. (2010). Optimal distributed generation location using mixed integer non-linear programming in hybrid electricity markets. *IET Generation, Transmission & Distribution, 4*(2), 281-298.

Lalitha, M. P., Reddy, N. S. and Reddy, V. V. J. I. j. o. r. i. c. (2010). Optimal DG Placement for maximum loss reduction in radial distribution system using ABC Algorithm. *3*, 44-52.

Larik, R. M., Mustafa, M. W., Panjwani, M. K. J. I. J. o. E. E. and Science, C. (2019). A statistical jacobian application for power system optimization of voltage stability. *13*(1), 331-338.

Lee, S.-H. and Park, J.-W. (2009). Selection of optimal location and size of multiple distributed generations by using Kalman filter algorithm. *IEEE transactions on power systems, 24*(3), 1393-1400.

Li, S., Ajjarapu, V. and Djukanovic, M. J. I. T. o. P. S. (2017). Adaptive online monitoring of voltage stability margin via local regression. *33*(1), 701-713.

Liu, Z., Wen, F. and Ledwich, G. (2011). Optimal siting and sizing of distributed generators in distribution systems considering uncertainties. *IEEE transactions on power delivery, 26*(4), 2541-2551.

López-Lezama, J. M., Contreras, J. and Padilha-Feltrin, A. (2012). Location and contract pricing of distributed generation using a genetic algorithm. *International Journal of Electrical Power & Energy Systems, 36*(1), 117-126.

MacLean, M. (2017). *Spatial transformations and the emergence of'the national': infrastructures and the formation of the United Arab Emirates, 1950-1980.* New York University.

Mahmud, N., Zahedi, A. J. R. and Reviews, S. E. (2016). Review of control strategies for voltage regulation of the smart distribution network with high penetration of renewable distributed generation. *64*, 582-595.

Makasa, K. J. and Venayagamoorthy, G. K. (2011). *On-line voltage stability load index estimation based on PMU measurements. Paper presented at the 2011 IEEE Power and Energy Society General Meeting.Journal*, 1-6.

Malathy, P. and Shunmugalatha, A. (2016). *Enhancement of Maximum Loadability during N-1 and N-2 contingencies with multi type FACTS devices and its optimization using MDE algorithm. Paper presented at the Electrical, Computer and Electronics Engineering (UPCON), 2016 IEEE Uttar Pradesh Section International Conference on.Journal*, 173-178.

Mehdi, O. H., Izzri, N. and Abd, M. K. (2011). Fast prediction of voltage stability index based on radial basis function neural network: Iraqi super grid network, 400-kV. *Modern Applied Science, 5*(4), 190.

Milosevic, B. and Begovic, M. (2003). Voltage-stability protection and control using a wide-area network of phasor measurements. *IEEE transactions on power systems, 18*(1), 121-127.

Modarresi, J., Gholipour, E., Khodabakhshian, A. J. R. and Reviews, S. E. (2016). A comprehensive review of the voltage stability indices. *63*, 1-12.

Moghavvemi, M. and Faruque, M. (2001). Technique for assessment of voltage stability in ill-conditioned radial distribution network. *IEEE Power Engineering Review, 21*(1), 58-60.

Moghavvemi, M. and Faruque, O. (1998). Real-time contingency evaluation and ranking technique. *IEE Proceedings-Generation, Transmission and Distribution, 145*(5), 517-524.

Moghavvemi, M. and Omar, F. (1998). Technique for contingency monitoring and voltage collapse prediction. *IEE Proceedings-Generation, Transmission and Distribution, 145*(6), 634-640.

Mohamed, A., Jasmon, G. and Yusoff, S. (1989). A static voltage collapse indicator using line stability factors. *Journal of industrial technology, 7*(1), 73-85.

Momoh, J. A. (2017). *Electric power distribution, automation, protection, and control*: CRC press.

Moradi, M. H., Abedini, M. J. I. J. o. E. P. and Systems, E. (2012). A combination of genetic algorithm and particle swarm optimization for optimal DG location and sizing in distribution systems. *34*(1), 66-74.

Moradi, M. H., Foroutan, V. B., Abedini, M. J. R. and Reviews, S. E. (2017). Power flow analysis in islanded Micro-Grids via modeling different operational modes of DGs: A review and a new approach. *69*, 248-262.

Moradijoz, M., Moghaddam, M. P. and Haghifam, M. J. E. (2018). A flexible active distribution system expansion planning model: A risk-based approach. *145*, 442-457.

Musirin, I. and Rahman, T. A. (2002). *Novel fast voltage stability index (FVSI) for voltage stability analysis in power transmission system. Paper presented at the Student Conference on Research and Development.Journal*, 265-268.

Muthukumar, K. and Jayalalitha, S. J. A. S. C. (2017). Integrated approach of network reconfiguration with distributed generation and shunt capacitors placement for power loss minimization in radial distribution networks. *52*, 1262-1284.

Nadu, T. (2018). A Review on Smart Grid and its Application.

Nara, K., Hayashi, Y., Ikeda, K. and Ashizawa, T. (2001). *Application of tabu search to optimal placement of distributed generators. Paper presented at the 2001 IEEE Power Engineering Society Winter Meeting. Conference Proceedings (Cat. No. 01CH37194).Journal, 2*, 918-923.

Nizam, M., Mohamed, A. and Hussain, A. (2006). *Dynamic voltage collapse prediction in power systems using power transfer stability index. Paper presented at the 2006 IEEE International Power and Energy Conference.Journal*, 246-250.

Njenda, T. C., Golshan, M. and Alhelou, H. H. (2018). *WAMS based Under Frequency Load Shedding Considering Minimum Frequency Predicted and Extrapolated Disturbance Magnitude. Paper presented at the 2018 Smart Grid Conference (SGC).Journal*, 1-5.

Nosratabadi, S. M., Hooshmand, R.-A., Gholipour, E. J. R. and Reviews, S. E. (2017). A comprehensive review on microgrid and virtual power plant concepts employed for distributed energy resources scheduling in power systems. *67*, 341-363.

Novoa, C. and Jin, T. (2011). Reliability centered planning for distributed generation considering wind power volatility. *Electric power systems research, 81*(8), 1654-1661.

Ochoa, L. F., Dent, C. J. and Harrison, G. P. (2009). Distribution network capacity assessment: Variable DG and active networks. *IEEE transactions on power systems, 25*(1), 87-95.

Ochoa, L. F. and Harrison, G. P. (2010). Minimizing energy losses: Optimal accommodation and smart operation of renewable distributed generation. *IEEE transactions on power systems, 26*(1), 198-205.

Ochoa, L. F., Padilha-Feltrin, A. and Harrison, G. P. (2008a). Evaluating distributed time-varying generation through a multiobjective index. *IEEE transactions on power delivery, 23*(2), 1132-1138.

Ochoa, L. F., Padilha-Feltrin, A. and Harrison, G. P. (2008b). Time-series-based maximization of distributed wind power generation integration. *IEEE Transactions on Energy conversion, 23*(3), 968-974.

Ospina, J., Gupta, N., Newaz, A., Harper, M., Faruque, M. O., Collins, E. G., . . . Journal, E. T. S. (2019). Sampling-Based Model Predictive Control of PV-Integrated Energy Storage System Considering Power Generation Forecast and Real-Time Price. *6*(4), 195-207.

Pandi, V. R., Zeineldin, H. and Xiao, W. (2012). Determining optimal location and size of distributed generation resources considering harmonic and protection coordination limits. *IEEE transactions on power systems, 28*(2), 1245-1254.

Papari, B. (2018). Intelligent Energy and Operation Management of AC, DC and Hybrid Microgrids Based on Evolutionary Techniques.

Parhizi, S., Lotfi, H., Khodaei, A. and Bahramirad, S. J. I. A. (2015). State of the art in research on microgrids: A review. *3*, 890-925.

Petinrin, J., Shaabanb, M. J. R. and Reviews, S. E. (2016). Impact of renewable generation on voltage control in distribution systems. *65*, 770-783.

Polster, S. and Renner, H. J. C.-O. A. P. J. (2017). Voltage stability monitoring methods for distribution grids using the Thevenin impedance. *2017*(1), 1535-1539.

Pontryagin, L. S. (2018). *Mathematical theory of optimal processes*: Routledge.

Popović, D., Greatbanks, J., Begović, M. and Pregelj, A. (2005). Placement of distributed generators and reclosers for distribution network security and reliability. *International Journal of Electrical Power & Energy Systems, 27*(5-6), 398-408.

Porkar, S., Poure, P., Abbaspour-Tehrani-fard, A. and Saadate, S. (2011). Optimal allocation of distributed generation using a two-stage multi-objective mixed-integer-nonlinear programming. *European transactions on electrical power, 21*(1), 1072-1087.

Prakash, P., Khatod, D. K. J. R. and Reviews, S. E. (2016). Optimal sizing and siting techniques for distributed generation in distribution systems: A review. *57*, 111-130.

Prommee, W. and Ongsakul, W. (2011). Optimal multiple distributed generation placement in microgrid system by improved reinitialized social structures particle swarm optimization. *European transactions on electrical power, 21*(1), 489-504.

Quadri, I. A., Bhowmick, S. and Joshi, D. J. A. e. (2018). A comprehensive technique for optimal allocation of distributed energy resources in radial distribution systems. *211*, 1245-1260.

Rahman, T. A. and Jasmon, G. (1995). *A new technique for voltage stability analysis in a power system and improved loadflow algorithm for distribution network. Paper presented at the Proceedings 1995 International Conference on Energy Management and Power Delivery EMPD'95.Journal, 2*, 714-719.

Raju Jr, N. V. (2018). Emergency stability control of power systems using wide area synchrophasor measurements.

Rao, R. S., Ravindra, K., Satish, K. and Narasimham, S. (2012). Power loss minimization in distribution system using network reconfiguration in the presence of distributed generation. *IEEE transactions on power systems, 28*(1), 317-325.

Raoofat, M. (2011). Simultaneous allocation of DGs and remote controllable switches in distribution networks considering multilevel load model. *International Journal of Electrical Power & Energy Systems, 33*(8), 1429-1436.

Rau, N. S. and Wan, Y.-h. (1994). Optimum location of resources in distributed planning. *IEEE transactions on power systems, 9*(4), 2014-2020.

Renders, J.-M. and Bersini, H. (1994). *Hybridizing genetic algorithms with hill-climbing methods for global optimization: two possible ways. Paper presented at the Proceedings of the First IEEE Conference on Evolutionary Computation. IEEE World Congress on Computational Intelligence.Journal*, 312-317.

Rotaru, F., Chicco, G., Grigoras, G. and Cartina, G. (2012). Two-stage distributed generation optimal sizing with clustering-based node selection. *International Journal of Electrical Power & Energy Systems, 40*(1), 120-129.

Sadigh, A. K. (2014). *Preparation of Power Distribution System for High Penetration of Renewable Energy Part I. Dynamic Voltage Restorer for Voltage Regulation Pat II. Distribution Circuit Modeling and Validation.* University of California, Irvine.

Sahari, S., Abidin, A. F. and Rahman, T. A. (2003). *Development of artificial neural network for voltage stability monitoring. Paper presented at the Proceedings. National Power Engineering Conference, 2003. PECon 2003.Journal*, 37-42.

Salimans, T., Ho, J., Chen, X., Sidor, S. and Sutskever, I. J. a. p. a. (2017). Evolution strategies as a scalable alternative to reinforcement learning.

Samuel, I. A., Katende, J., Awosope, C. O. and Awelewa, A. A. J. I. J. o. A. E. R. (2017). Prediction of voltage collapse in electrical power system networks using a new voltage stability index. *12*(2), 190-199.

Schauder, C., Gernhardt, M., Stacey, E., Lemak, T., Gyugyi, L., Cease, T. and Edris, A. (1995). Development of a/spl plusmn/100 MVAr static condenser for voltage control of transmission systems. *IEEE transactions on power delivery, 10*(3), 1486-1496.

Shaaban, M. F., Atwa, Y. M. and El-Saadany, E. F. (2012). DG allocation for benefit maximization in distribution networks. *IEEE transactions on power systems, 28*(2), 639-649.

Shahidehpour, M. and Alomoush, M. (2017). *Restructured electrical power systems: Operation: Trading, and volatility*: CRC Press.

Sharma, A. K., Saxena, A. and Tiwari, R. J. I. J. o. C. A. (2016). Voltage stability assessment using GVSM and preventive control using SVC. *142*(11), 23-31.

Shukla, T., Singh, S., Srinivasarao, V. and Naik, K. (2010). Optimal sizing of distributed generation placed on radial distribution systems. *Electric Power Components and Systems, 38*(3), 260-274.

Simpson-Porco, J. W., Dörfler, F. and Bullo, F. J. I. T. o. A. C. (2016). Voltage stabilization in microgrids via quadratic droop control. *62*(3), 1239-1253.

Singh, A., Parida, S. J. R. and Reviews, S. E. (2018). A review on distributed generation allocation and planning in deregulated electricity market. *82*, 4132-4141.

Singh, D., Misra, R. and Singh, D. (2007). Effect of load models in distributed generation planning. *IEEE transactions on power systems, 22*(4), 2204-2212.

Singh, D., Singh, D. and Verma, K. (2009). Multiobjective optimization for DG planning with load models. *IEEE transactions on power systems, 24*(1), 427-436.

Singh, R. and Goswami, S. (2009). Optimum siting and sizing of distributed generations in radial and networked systems. *Electric Power Components and Systems, 37*(2), 127-145.

Singh, R. K. and Goswami, S. (2010). Optimum allocation of distributed generations based on nodal pricing for profit, loss reduction, and voltage improvement including voltage rise issue. *International Journal of Electrical Power & Energy Systems, 32*(6), 637-644.

Singh, R. K. and Goswami, S. (2011). Multi-objective optimization of distributed generation planning using impact indices and trade-off technique. *Electric Power Components and Systems, 39*(11), 1175-1190.

Smon, I., Verbic, G. and Gubina, F. (2006). Local voltage-stability index using Tellegen's theorem. *IEEE transactions on power systems, 21*(3), 1267-1275.

Soares, N., Martins, A., Carvalho, A., Caldeira, C., Du, C., Castanheira, É., . . . Reviews, S. E. (2018). The challenging paradigm of interrelated energy systems towards a more sustainable future. *95*, 171-193.

Soroudi, A. and Ehsan, M. (2011). Efficient immune-GA method for DNOs in sizing and placement of distributed generation units. *European transactions on electrical power, 21*(3), 1361-1375.

Subramani, C., Dash, S., Bhaskar, M. A., Jagadeeshkumar, M., Sureshkumar, K. and Parthipan, R. (2009). *Line outage contingency screening and ranking for voltage stability assessment. Paper presented at the 2009 International Conference on Power Systems.Journal*, 1-5.

Sultana, S., Roy, P. K. J. I. J. o. E. P. and Systems, E. (2014). Multi-objective quasi-oppositional teaching learning based optimization for optimal location of distributed generator in radial distribution systems. *63*, 534-545.

Sultana, U., Khairuddin, A. B., Aman, M., Mokhtar, A., Zareen, N. J. R. and Reviews, S. E. (2016). A review of optimum DG placement based on minimization of power losses and voltage stability enhancement of distribution system. *63*, 363-378.

Tamimi, A. A., Pahwa, A. and Starrett, S. (2012). Effective wind farm sizing method for weak power systems using critical modes of voltage instability. *IEEE transactions on power systems, 27*(3), 1610-1617.

Taylor, S. A. and Baker, T. L. (1994). An assessment of the relationship between service quality and customer satisfaction in the formation of consumers' purchase intentions. *Journal of retailing, 70*(2), 163-178.

Tazi, K., Abbou, F. M. and Abdi, F. J. A. I. R. (2019). Multi-agent system for microgrids: design, optimization and performance. 1-60.

Teng, J.-H., Liu, Y.-H., Chen, C.-Y. and Chen, C.-F. (2007). Value-based distributed generator placements for service quality improvements. *International Journal of Electrical Power & Energy Systems, 29*(3), 268-274.

Theo, W. L., Lim, J. S., Ho, W. S., Hashim, H., Lee, C. T. J. R. and Reviews, S. E. (2017). Review of distributed generation (DG) system planning and optimisation techniques: Comparison of numerical and mathematical modelling methods. *67*, 531-573.

Thurner, L., Scheidler, A., Schäfer, F., Menke, J.-H., Dollichon, J., Meier, F., . . . Braun, M. J. I. T. o. P. S. (2018). Pandapower—An open-source python tool for convenient modeling, analysis, and optimization of electric power systems. *33*(6), 6510-6521.

Tiwari, R., Niazi, K. and Gupta, V. (2012). Line collapse proximity index for prediction of voltage collapse in power systems. *International Journal of Electrical Power & Energy Systems, 41*(1), 105-111.

Tran, M. T. (2009). Definition and implementation of voltage stability indices in PSS® NETOMAC.

Usman, M., Amin, A., Azam, M. M. and Mokhlis, H. (2018). *Optimal under voltage load shedding scheme for a distribution network using EPSO algorithm. Paper presented at the 2018 1st International Conference on Power, Energy and Smart Grid (ICPESG).Journal*, 1-6.

Van der Merwe, S. E. (2019). Advancing resilience assessments: the social dimensions of electricity supply in South Africa.

Verbic, G. and Gubina, F. (2004). A new concept of voltage-collapse protection based on local phasors. *IEEE transactions on power delivery*, *19*(2), 576-581.

Vinnakota, V. R., Yao, M. Z. and Atanackovic, D. (2008). *Modelling issues of system protection schemes in energy management systems. Paper presented at the Electric Power Conference, 2008. EPEC 2008. IEEE Canada.Journal*, 1-6.

Vinothkumar, K. and Selvan, M. (2011). Fuzzy embedded genetic algorithm method for distributed generation planning. *Electric Power Components and Systems*, *39*(4), 346-366.

Vinothkumar, K. and Selvan, M. (2012). Distributed generation planning: A new approach based on goal programming. *Electric Power Components and Systems*, *40*(5), 497-512.

Vovos, P. N. and Bialek, J. W. (2005). Direct incorporation of fault level constraints in optimal power flow as a tool for network capacity analysis. *IEEE transactions on power systems*, *20*(4), 2125-2134.

Vovos, P. N., Harrison, G. P., Wallace, A. R. and Bialek, J. W. (2005). Optimal power flow as a tool for fault level-constrained network capacity analysis. *IEEE transactions on power systems*, *20*(2), 734-741.

Walling, R., Saint, R., Dugan, R. C., Burke, J. and Kojovic, L. A. (2008). Summary of distributed resources impact on power delivery systems. *IEEE transactions on power delivery*, *23*(3), 1636-1644.

Wang, C. and Nehrir, M. H. (2004). Analytical approaches for optimal placement of distributed generation sources in power systems. *IEEE transactions on power systems*, *19*(4), 2068-2076.

Wang, L., Liu, Y. and Luan, Z. (2005). *Power transmission paths based voltage stability assessment. Paper presented at the 2005 IEEE/PES Transmission & Distribution Conference & Exposition: Asia and Pacific.Journal*, 1-5.

Wang, L. and Singh, C. (2008). Reliability-constrained optimum placement of reclosers and distributed generators in distribution networks using an ant colony system algorithm. *IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews)*, *38*(6), 757-764.

Wang, X.-H. and Li, J.-J. (2004). *Hybrid particle swarm optimization with simulated annealing. Paper presented at the Proceedings of 2004 International Conference on Machine Learning and Cybernetics (IEEE Cat. No. 04EX826).Journal*, *4*, 2402-2405.

Wang, Y., Li, W. and Lu, J. (2009). A new node voltage stability index based on local voltage phasors. *Electric power systems research, 79*(1), 265-271.

Wang, Z., Cui, B. and Wang, J. J. I. T. o. P. S. (2016). A necessary condition for power flow insolvability in power distribution systems with distributed generators. *32*(2), 1440-1450.

Willis, H. L. (2000). *Analytical methods and rules of thumb for modeling DG-distribution interaction. Paper presented at the 2000 Power Engineering Society Summer Meeting (Cat. No. 00CH37134).Journal, 3*, 1643-1644.

Wiszniewski, A. (2007). New criteria of voltage stability margin for the purpose of load shedding. *IEEE transactions on power delivery, 22*(3), 1367-1371.

Wong, L. A., Ramachandaramurthy, V. K., Taylor, P., Ekanayake, J., Walker, S. L. and Padmanaban, S. J. J. o. E. S. (2019). Review on the optimal placement, sizing and control of an energy storage system in the distribution network. *21*, 489-504.

Yazdanpanah-Goharrizi, A. and Asghari, R. (2007). *A novel line stability index (NLSI) for voltage stability assessment of power systems. Paper presented at the Proceedings 7th WSEAS Int. Conf. on Power Systems.Journal*, 164-167.

Yong, J. Y., Ramachandaramurthy, V. K., Tan, K. M., Mithulananthan, N. J. R. and Reviews, S. E. (2015). A review on the state-of-the-art technologies of electric vehicle, its impacts and prospects. *49*, 365-385.

Zeineldin, H. and El-Saadany, E. F. (2017). Protection coordination index enhancement considering multiple DG locations using FCL. *IEEE transactions on power delivery, 32*(1), 344-350.

Zhu, D., Broadwater, R. P., Tam, K.-S., Seguin, R. and Asgeirsson, H. (2006). Impact of DG placement on reliability and efficiency with time-varying loads. *IEEE transactions on power systems, 21*(1), 419-427.

Zhu, J. (2015). *Optimization of power system operation*: John Wiley & Sons.

Ziari, I., Ledwich, G., Ghosh, A. and Platt, G. (2013). Optimal distribution network reinforcement considering load growth, line loss, and reliability. *IEEE transactions on power systems, 28*(2), 587-597.

Zio, E., Delfanti, M., Giorgi, L., Olivieri, V., Sansavini, G. J. I. J. o. E. P. and Systems, E. (2015). Monte Carlo simulation-based probabilistic assessment of DG penetration in medium voltage distribution networks. 64, 852-860.

Abdel-mawgoud, H., Kamel, S., Ebeed, M. and Aly, M. M. (2018). An efficient hybrid approach for optimal allocation of DG in radial distribution networks. Paper presented at the 2018 International Conference on Innovative Trends in Computer Engineering (ITCE).Journal, 311-316.

Abdelaziz, A. Y., Hegazy, Y. G., El-Khattam, W., Othman, M. M. J. E. P. C. and Systems. (2015). A multi-objective optimization for sizing and placement of voltage-controlled distributed generation using supervised big bang–big crunch method. 43(1), 105-117.

Abdmouleh, Z., Gastli, A., Ben-Brahim, L., Haouari, M. and Al-Emadi, N. A. J. R. E. (2017). Review of optimization techniques applied for the integration of distributed generation from renewable energy sources. 113, 266-280.

Abu-Mouti, F. and El-Hawary, M. (2011a). Heuristic curve-fitted technique for distributed generation optimisation in radial distribution feeder systems. IET Generation, Transmission & Distribution, 5(2), 172-180.

Abu-Mouti, F. S. and El-Hawary, M. (2011b). Optimal distributed generation allocation and sizing in distribution systems via artificial bee colony algorithm. IEEE transactions on power delivery, 26(4), 2090-2101.

Abu-Mouti, F. S. and El-Hawary, M. J. I. t. o. p. d. (2011c). Optimal distributed generation allocation and sizing in distribution systems via artificial bee colony algorithm. 26(4), 2090-2101.

Acharya, N., Mahat, P. and Mithulananthan, N. (2006). An analytical approach for DG allocation in primary distribution network. International Journal of Electrical Power & Energy Systems, 28(10), 669-678.

Akagi, H., Watanabe, E. H. and Aredes, M. (2017). Instantaneous power theory and applications to power conditioning: John Wiley & Sons.

Akorede, M. F., Hizam, H., Aris, I. and Ab Kadir, M. (2011). Effective method for optimal allocation of distributed generation units in meshed electric power systems. IET Generation, Transmission & Distribution, 5(2), 276-287.

Al Abri, R., El-Saadany, E. F. and Atwa, Y. M. (2012). Optimal placement and sizing method to improve the voltage stability margin in a distribution system using distributed generation. IEEE transactions on power systems, 28(1), 326-334.

Albuquerque, M. A. and Castro, C. A. (2003). A contingency ranking method for voltage stability in real time operation of power systems. Paper presented at the 2003 IEEE Bologna Power Tech Conference Proceedings.Journal, 1, 5 pp. Vol. 1.

AlHajri, M., AlRashidi, M. and El-Hawary, M. (2010). Improved sequential quadratic programming approach for optimal distribution generation deployments via stability and sensitivity analyses. Electric Power Components and Systems, 38(14), 1595-1614.

Alipour, A., Asis, C. A. C., Avanzado, J. J. P. and Pacis, M. C. (2016). Study in the impact of Distributed Generator (DG) placement and sizing on a ring distribution network. Paper presented at the Region 10 Conference (TENCON), 2016 IEEE.Journal, 1198-1203.

Althowibi, F. and Mustafa, M. (2010). Line voltage stability calculations in power systems. Paper presented at the 2010 IEEE International Conference on Power and Energy.Journal, 396-401.

Amin, A., Kamel, S. and Yu, J. (2018). developed analytical technique for optimal placement and sizing of DG and DSTATCOM in radial distribution systems. Paper presented at the 2018 Twentieth International Middle East Power Systems Conference (MEPCON).Journal, 1087-1091.

Arya, A. K., Kumar, A. and Yadav, A. J. I. J. R. I. T. C. C. (2017). Optimal Placement and Sizing of Distributed Generators by Using Voltage Indexing & Heuristic Method". 5, 945-949.

Arya, L., Koshti, A. and Choube, S. (2012). Distributed generation planning using differential evolution accounting voltage stability consideration. International Journal of Electrical Power & Energy Systems, 42(1), 196-207.

Atwa, Y., El-Saadany, E., Salama, M. and Seethapathy, R. (2009). Optimal renewable resources mix for distribution system energy loss minimization. IEEE transactions on power systems, 25(1), 360-370.

Atwa, Y. M. and El-Saadany, E. F. (2011). Probabilistic approach for optimal allocation of wind-based distributed generation in distribution systems. IET Renewable Power Generation, 5(1), 79-88.

Ayres, R. (2016). The New World: And Science Energy, Complexity and Wealth Maximization (pp. 255-301): Springer.

Baghaee, H. R., Mirsalim, M., Gharehpetian, G. B., Talebi, H. A. J. S. M. P. and Theory. (2017). Application of RBF neural networks and unscented transformation in probabilistic power-flow of microgrids including correlated wind/PV units and plug-in hybrid electric vehicles. 72, 51-68.

Banerjee, B. and Islam, S. M. (2011). Reliability based optimum location of distributed generation. International Journal of Electrical Power & Energy Systems, 33(8), 1470-1478.

Barani, M., Aghaei, J., Akbari, M. A., Niknam, T., Farahmand, H. and Korpås, M. J. I. T. o. S. G. (2018). Optimal partitioning of smart distribution systems into supply-sufficient microgrids. 10(3), 2523-2533.

Barthélemy, J. and Marx, M. (2018). Solving Rational Expectations Models The Oxford Handbook of Computational Economics and Finance: Oxford University Press.

Behera, S. (2015). Study of Voltage Stability Using Intelligent Techniques.

Behera, S., Sahoo, S., Pati, B. J. R. and Reviews, S. E. (2015). A review on optimization algorithms and application to wind energy integration to grid. 48, 214-227.

Bevrani, H., Watanabe, M. and Mitani, Y. (2014). Power system monitoring and control: John Wiley & Sons.

Blaabjerg, F., Yang, Y., Yang, D. and Wang, X. J. P. o. t. I. (2017). Distributed power-generation systems and protection. 105(7), 1311-1331.

Borges, C. L. and Falcao, D. M. (2006). Optimal distributed generation allocation for reliability, losses, and voltage improvement. International Journal of Electrical Power & Energy Systems, 28(6), 413-420.

Bouzid, A. M., Guerrero, J. M., Cheriti, A., Bouhamida, M., Sicard, P., Benghanem, M. J. R. and Reviews, S. E. (2015). A survey on control of electric power distributed generation systems for microgrid applications. 44, 751-766.

Canizares, C. A., De Souza, A. C. and Quintana, V. H. (1996). Comparison of performance indices for detection of proximity to voltage collapse. IEEE transactions on power systems, 11(3), 1441-1450.

Carpinelli, G., Celli, G., Mocci, S., Pilo, F. and Russo, A. (2005). Optimisation of embedded generation sizing and siting by using a double trade-off method. IEE Proceedings-Generation, Transmission and Distribution, 152(4), 503-513.

Carpinelli, G., Celli, G., Pilo, F. and Russo, A. (2003). Embedded generation planning under uncertainty including power quality issues. European transactions on electrical power, 13(6), 381-389.

Celli, G., Ghiani, E., Mocci, S. and Pilo, F. (2005). A multiobjective evolutionary algorithm for the sizing and siting of distributed generation. IEEE transactions on power systems, 20(2), 750-757.

Chattopadhyay, T. K., Banerjee, S. and Chanda, C. K. (2014). Impact of distributed generator on voltage stability analysis of distribution networks under critical loading conditions. Paper presented at the 2014 1st International Conference on Non Conventional Energy (ICONCE 2014).Journal, 288-291.

Chebbo, A., Irving, M. and Sterling, M. (1992). Reactive power dispatch incorporating voltage stability. Paper presented at the IEE Proceedings C (Generation, Transmission and Distribution).Journal, 139(3), 253-260.

Cherry, D. D. (2012). Optimal placement of distributed generation on a power system using particle swarm optimization. Mississippi State University.

Colmenar-Santos, A., Reino-Rio, C., Borge-Diez, D., Collado-Fernandez, E. J. R. and Reviews, S. E. (2016). Distributed generation: A review of factors that can contribute most to achieve a scenario of DG units embedded in the new distribution networks. 59, 1130-1148.

Costa, P. M. and Matos, M. A. (2009). Avoided losses on LV networks as a result of microgeneration. Electric power systems research, 79(4), 629-634.

Danish, M. S. S. (2015). Voltage Stability in Electric Power System: A Practical Introduction: Logos Verlag Berlin GmbH.

Das, C. K., Bass, O., Kothapalli, G., Mahmoud, T. S., Habibi, D. J. R. and Reviews, S. E. (2018). Overview of energy storage systems in distribution networks: Placement, sizing, operation, and power quality. 91, 1205-1230.

Deng, P., Sun, Y. and Xu, J. (2009). A new index of voltage stability considering distribution network. Paper presented at the 2009 Asia-Pacific Power and Energy Engineering Conference.Journal, 1-4.

Dent, C. J., Ochoa, L. F. and Harrison, G. P. (2010). Network distributed generation capacity analysis using OPF with voltage step constraints. IEEE transactions on power systems, 25(1), 296-304.

Derafshian, M., Amjady, N. and Dehghan, S. (2016). Special protection scheme against voltage collapse. IET Generation, Transmission & Distribution, 10(2), 341-351.

Ehsan, A. and Yang, Q. J. A. E. (2018). Optimal integration and planning of renewable distributed generation in the power distribution networks: A review of analytical techniques. 210, 44-59.

El-Ela, A. A., Allam, S. M. and Shatla, M. (2010). Maximal optimal benefits of distributed generation using genetic algorithms. Electric power systems research, 80(7), 869-877.

El-Khattam, W., Bhattacharya, K., Hegazy, Y. and Salama, M. (2004). Optimal investment planning for distributed generation in a competitive electricity market. IEEE transactions on power systems, 19(3), 1674-1684.

El-Khattam, W., Hegazy, Y. and Salama, M. (2005). An integrated distributed generation optimization model for distribution system planning. IEEE transactions on power systems, 20(2), 1158-1165.

El-Zonkoly, A. (2011). Optimal placement of multi-distributed generation units including different load models using particle swarm optimization. Swarm and Evolutionary Computation, 1(1), 50-59.

Elumalai, S., Karunakaran, U., Lee, I. K., Moon, J. S. and Won, K. C. J. R. b. (2017). Rac1-NADPH oxidase signaling promotes CD36 activation under glucotoxic conditions in pancreatic beta cells. 11, 126-134.

Eminoglu, U. and Hocaoglu, M. (2007). A voltage stability index for radial distribution networks. Paper presented at the 2007 42nd International Universities Power Engineering Conference.Journal, 408-413.

Expósito, A. G., Gomez-Exposito, A., Conejo, A. J. and Canizares, C. (2016). Electric energy systems: analysis and operation: CRC Press.

Fan, C., Xiao, F. and Wang, S. J. A. E. (2014). Development of prediction models for next-day building energy consumption and peak power demand using data mining techniques. 127, 1-10.

Flynn, D., Rather, Z., Ardal, A., D'Arco, S., Hansen, A. D., Cutululis, N. A., . . . Environment. (2017). Technical impacts of high penetration levels of wind power on power system stability. 6(2), e216.

Galal-Khallaf, A., Ardura, A., Mohammed-Geba, K., Borrell, Y. J. and Garcia-Vazquez, E. J. F. c. (2014). DNA barcoding reveals a high level of mislabeling in Egyptian fish fillets. 46, 441-445.

Gamarra, C., Guerrero, J. M. J. R. and Reviews, S. E. (2015). Computational optimization techniques applied to microgrids planning: A review. 48, 413-424.

Gandomkar, M., Vakilian, M. and Ehsan, M. (2005). A genetic–based tabu search algorithm for optimal DG allocation in distribution networks. Electric Power Components and Systems, 33(12), 1351-1362.

Gao, H., Chen, Y., Xu, Y. and Liu, C.-C. J. I. T. o. S. G. (2016). Resilience-oriented critical load restoration using microgrids in distribution systems. 7(6), 2837-2848.

Gautam, D. and Mithulananthan, N. (2007). Optimal DG placement in deregulated electricity market. Electric power systems research, 77(12), 1627-1636.

Ghosh, S., Ghoshal, S. P. and Ghosh, S. (2010). Optimal sizing and placement of distributed generation in a network system. International Journal of Electrical Power & Energy Systems, 32(8), 849-856.

Giraldo Chavarriaga, J. S. (2015). Robust and efficient voltage stability margin computation using synchrophasors: Cálculo robusto e eficiente da margem de estabilidade de tensão usando sincrofasores.

Gkaidatzis, P. A., Bouhouras, A. S., Doukas, D. I., Sgouras, K. I. and Labridis, D. P. J. E. P. S. R. (2017). Load variations impact on optimal DG placement problem concerning energy loss reduction. 152, 36-47.

Glisson Jr, T. H. (2011). Complex Power Introduction to Circuit Analysis and Design (pp. 479-520): Springer.

Golshan, M. E. H. and Ali Arefifar, S. (2007). Optimal allocation of distributed generation and reactive sources considering tap positions of voltage regulators as control variables. European transactions on electrical power, 17(3), 219-239.

Gomez-Exposito, A., Conejo, A. J. and Canizares, C. (2018). Electric energy systems: analysis and operation: CRC press.

Gomez-Gonzalez, M., López, A. and Jurado, F. (2012). Optimization of distributed generation systems using a new discrete PSO and OPF. Electric power systems research, 84(1), 174-180.

Gong, Y., Schulz, N. and Guzman, A. (2006). Synchrophasor-based real-time voltage stability index. Paper presented at the 2006 IEEE PES Power Systems Conference and Exposition.Journal, 1029-1036.

Gözel, T. and Hocaoglu, M. H. (2009). An analytical method for the sizing and siting of distributed generators in radial systems. Electric power systems research, 79(6), 912-918.

HA, M. P., Huy, P. D., Ramachandaramurthy, V. K. J. R. and Reviews, S. E. (2017). A review of the optimal allocation of distributed generation: Objectives, constraints, methods, and algorithms. 75, 293-312.

Haesen, E., Driesen, J. and Belmans, R. (2007). Robust planning methodology for integration of stochastic generators in distribution grids. IET Renewable Power Generation, 1(1), 25-32.

Haghifam, M.-R., Falaghi, H. and Malik, O. (2008). Risk-based distributed generation placement. IET Generation, Transmission & Distribution, 2(2), 252-260.

Haghifam, S., Dadashi, M., Zare, K., Seyedi, H. J. S. C. and Society. (2020). Optimal operation of smart distribution networks in the presence of demand response aggregators and microgrid owners: A multi follower Bi-Level approach. 55, 102033.

Hajivand, M., Karimi, R., Karimi, M. J. I. J. o. I., Security and Management, S. (2014). Optimal recloser placement by binary differential evolutionary algorithm to improve reliability of distribution system. 3(2), 345-349.

Hamedi, H. and Gandomkar, M. (2012). A straightforward approach to minimizing unsupplied energy and power loss through DG placement and evaluating power quality in relation to load variations over time. International Journal of Electrical Power & Energy Systems, 35(1), 93-96.

Haque, M. (2007). Use of local information to determine the distance to voltage collapse. Paper presented at the 2007 International Power Engineering Conference (IPEC 2007).Journal, 407-412.

Harrison, G. and Wallace, A. (2005). Optimal power flow evaluation of distribution network capacity for the connection of distributed generation. IEE Proceedings-Generation, Transmission and Distribution, 152(1), 115-122.

Harrison, G. P., Piccolo, A., Siano, P. and Wallace, A. R. (2008). Hybrid GA and OPF evaluation of network capacity for distributed generation connections. Electric power systems research, 78(3), 392-398.

He, T., Kolluri, S., Mandal, S., Galvan, F. and Rasigoufard, P. (2004). Identification of weak locations in bulk transmission systems using voltage stability margin index. Paper presented at the IEEE Power Engineering Society General Meeting, 2004.Journal, 1814-1819.

Hedayati, H., Nabaviniaki, S., Akbarimajd and Akbarimajd, A. (2008). A method for placement of DG units in distribution networks. IEEE transactions on power delivery, 23(3), 1620-1628.

Hemdan, N. G. and Kurrat, M. (2011). Efficient integration of distributed generation for meeting the increased load demand. International Journal of Electrical Power & Energy Systems, 33(9), 1572-1583.

Hung, D. Q. and Mithulananthan, N. (2011). Multiple distributed generator placement in primary distribution networks for loss reduction. IEEE Transactions on Industrial Electronics, 60(4), 1700-1708.

Hung, D. Q., Mithulananthan, N. and Bansal, R. (2010). Analytical expressions for DG allocation in primary distribution networks. IEEE Transactions on Energy conversion, 25(3), 814-820.

Jabr, R. and Pal, B. (2009). Ordinal optimisation approach for locating and sizing of distributed generation. IET Generation, Transmission & Distribution, 3(8), 713-723.

Jain, S., Kalambe, S., Agnihotri, G., Mishra, A. J. R. and Reviews, S. E. (2017). Distributed generation deployment: State-of-the-art of distribution system planning in sustainable era. 77, 363-385.

Kanimozhi, R. and Selvi, K. (2013). A novel line stability index for voltage stability analysis and contingency ranking in power system using fuzzy based load flow. Journal of Electrical Engineering & Technology (JEET), 8(4), 694-703.

Karbalaei, F., Soleymani, H. and Afsharnia, S. (2010). A comparison of voltage collapse proximity indicators. Paper presented at the IPEC, 2010 Conference Proceedings.Journal, 429-432.

Kaur, P., Kaur, S. and Khanna, R. (2016). Optimal placement and sizing of DG comparison of different techniques of DG placement. Paper presented at the Power Electronics, Intelligent Control and Energy Systems (ICPEICES), IEEE International Conference on.Journal, 1-4.

Keane, A. and O'Malley, M. (2005). Optimal allocation of embedded generation on distribution networks. IEEE transactions on power systems, 20(3), 1640-1646.

Keane, A. and O'Malley, M. (2007). Optimal utilization of distribution networks for energy harvesting. IEEE transactions on power systems, 22(1), 467-475.

Kefayat, M., Ara, A. L., Niaki, S. N. J. E. C. and Management. (2015). A hybrid of ant colony optimization and artificial bee colony algorithm for probabilistic optimal placement and sizing of distributed energy resources. 92, 149-161.

Kenari, M. T., Sepasian, M. S., Nazar, M. S. J. I. J. o. E. P. and Systems, E. (2018). Probabilistic voltage stability assessment of distribution networks with wind generation using combined cumulants and maximum entropy method. 95, 96-107.

Kessel, P. and Glavitsch, H. (1986). Estimating the voltage stability of a power system. IEEE transactions on power delivery, 1(3), 346-354.

Khalesi, N., Rezaei, N. and Haghifam, M.-R. (2011). DG allocation with application of dynamic programming for loss reduction and reliability improvement. International Journal of Electrical Power & Energy Systems, 33(2), 288-295.

Khamis, A., Shareef, H., Mohamed, A. and Dong, Z. Y. J. A. S. E. J. (2018). A load shedding scheme for DG integrated islanded power system utilizing backtracking search algorithm. 9(1), 161-172.

Khamis, A., Shareef, H., Mohamed, A. J. I. G., Transmission and Distribution. (2015). Islanding detection and load shedding scheme for radial distribution systems integrated with dispersed generations. 9(15), 2261-2275.

Khan, H. and Choudhry, M. A. (2010). Implementation of Distributed Generation (IDG) algorithm for performance enhancement of distribution feeder under extreme load growth. International Journal of Electrical Power & Energy Systems, 32(9), 985-997.

Khodr, H., Silva, M. R., Vale, Z. and Ramos, C. (2010). A probabilistic methodology for distributed generation location in isolated electrical service area. Electric power systems research, 80(4), 390-399.

Kilonzi, C. J. (2014). Loss reduction and voltage profile improvement by optimal placement and sizing of distributed generation (DG) using a hybrid of genetic algorithm (GA) and improved particle swarm optimization (IPSO). University of Nairobi.

Kim, J., Nam, S., Park, S. and Singh, C. (1998). Dispersed generation planning using improved Hereford ranch algorithm. Electric power systems research, 47(1), 47-55.

Kim, K.-H., Lee, Y.-J., Rhee, S.-B., Lee, S.-K. and You, S.-K. (2002). Dispersed generator placement using fuzzy-GA in distribution systems. Paper presented at the IEEE Power Engineering Society Summer Meeting.Journal, 3, 1148-1153.

Kim, K. H., Song, K. B., Joo, S. K., Lee, Y. J. and Kim, J. O. (2008). Multiobjective distributed generation placement using fuzzy goal programming with genetic algorithm. European transactions on electrical power, 18(3), 217-230.

Kong, T., Jia, M. and Sun, G. (2016). Application of bacterial foraging algorithm for fault location in distribution networks with DG. Paper presented at the Electricity Distribution (CICED), 2016 China International Conference on.Journal, 1-4.

Kotamarty, S., Khushalani, S. and Schulz, N. (2008). Impact of distributed generation on distribution contingency analysis. Electric power systems research, 78(9), 1537-1545.

Koutroumpezis, G. and Safigianni, A. (2010). Optimum allocation of the maximum possible distributed generation penetration in a distribution network. Electric power systems research, 80(12), 1421-1427.

Krishnan, V., Ho, J., Hobbs, B. F., Liu, A. L., McCalley, J. D., Shahidehpour, M. and Zheng, Q. P. J. E. S. (2016). Co-optimization of electricity transmission and generation resources for planning and policy analysis: review of concepts and modeling approaches. 7(2), 297-332.

Kumar, A. and Gao, W. (2010). Optimal distributed generation location using mixed integer non-linear programming in hybrid electricity markets. IET Generation, Transmission & Distribution, 4(2), 281-298.

Lalitha, M. P., Reddy, N. S. and Reddy, V. V. J. I. j. o. r. i. c. (2010). Optimal DG Placement for maximum loss reduction in radial distribution system using ABC Algorithm. 3, 44-52.

Larik, R. M., Mustafa, M. W., Panjwani, M. K. J. I. J. o. E. E. and Science, C. (2019). A statistical jacobian application for power system optimization of voltage stability. 13(1), 331-338.

Lee, S.-H. and Park, J.-W. (2009). Selection of optimal location and size of multiple distributed generations by using Kalman filter algorithm. IEEE transactions on power systems, 24(3), 1393-1400.

Li, S., Ajjarapu, V. and Djukanovic, M. J. I. T. o. P. S. (2017). Adaptive online monitoring of voltage stability margin via local regression. 33(1), 701-713.

Liu, Y., Yang, J., Zhu, X., Wang, Y., He, B., Zhu, J. and Chen, Y. J. T. J. o. E. (2017). Bi-level planning model for optimal allocation of WT–PV–ESS in distribution networks. 2017(13), 1696-1701.

Liu, Z., Wen, F. and Ledwich, G. (2011). Optimal siting and sizing of distributed generators in distribution systems considering uncertainties. IEEE transactions on power delivery, 26(4), 2541-2551.

López-Lezama, J. M., Contreras, J. and Padilha-Feltrin, A. (2012). Location and contract pricing of distributed generation using a genetic algorithm. International Journal of Electrical Power & Energy Systems, 36(1), 117-126.

Machowski, J., Lubosny, Z., Bialek, J. W. and Bumby, J. R. (2020). Power system dynamics: stability and control: John Wiley & Sons.

MacLean, M. (2017). Spatial transformations and the emergence of'the national': infrastructures and the formation of the United Arab Emirates, 1950-1980. New York University.

Mahmud, N., Zahedi, A. J. R. and Reviews, S. E. (2016). Review of control strategies for voltage regulation of the smart distribution network with high penetration of renewable distributed generation. 64, 582-595.

Makasa, K. J. and Venayagamoorthy, G. K. (2011). On-line voltage stability load index estimation based on PMU measurements. Paper presented at the 2011 IEEE Power and Energy Society General Meeting.Journal, 1-6.

Malathy, P. and Shunmugalatha, A. (2016). Enhancement of Maximum Loadability during N-1 and N-2 contingencies with multi type FACTS devices and its optimization using MDE algorithm. Paper presented at the Electrical, Computer and Electronics Engineering (UPCON), 2016 IEEE Uttar Pradesh Section International Conference on.Journal, 173-178.

Mehdi, O. H., Izzri, N. and Abd, M. K. (2011). Fast prediction of voltage stability index based on radial basis function neural network: Iraqi super grid network, 400-kV. Modern Applied Science, 5(4), 190.

Milosevic, B. and Begovic, M. (2003). Voltage-stability protection and control using a wide-area network of phasor measurements. IEEE transactions on power systems, 18(1), 121-127.

Modarresi, J., Gholipour, E., Khodabakhshian, A. J. R. and Reviews, S. E. (2016). A comprehensive review of the voltage stability indices. 63, 1-12.

Moghavvemi, M. and Faruque, M. (2001). Technique for assessment of voltage stability in ill-conditioned radial distribution network. IEEE Power Engineering Review, 21(1), 58-60.

Moghavvemi, M. and Faruque, O. (1998). Real-time contingency evaluation and ranking technique. IEE Proceedings-Generation, Transmission and Distribution, 145(5), 517-524.

Moghavvemi, M. and Omar, F. (1998). Technique for contingency monitoring and voltage collapse prediction. IEE Proceedings-Generation, Transmission and Distribution, 145(6), 634-640.

Mohamed, A., Jasmon, G. and Yusoff, S. (1989). A static voltage collapse indicator using line stability factors. Journal of industrial technology, 7(1), 73-85.

Mohsenzadeh, A., Pang, C. and Haghifam, M.-R. J. I. S. J. (2017). Determining optimal forming of flexible microgrids in the presence of demand response in smart distribution systems. 12(4), 3315-3323.

Moradi, M. H., Abedini, M. J. I. J. o. E. P. and Systems, E. (2012). A combination of genetic algorithm and particle swarm optimization for optimal DG location and sizing in distribution systems. 34(1), 66-74.

Moradi, M. H., Foroutan, V. B., Abedini, M. J. R. and Reviews, S. E. (2017). Power flow analysis in islanded Micro-Grids via modeling different operational modes of DGs: A review and a new approach. 69, 248-262.

Moradijoz, M., Moghaddam, M. P. and Haghifam, M. J. E. (2018). A flexible active distribution system expansion planning model: A risk-based approach. 145, 442-457.

Mozafar, M. R., Amini, M. H. and Moradi, M. H. J. E. P. S. R. (2018). Innovative appraisement of smart grid operation considering large-scale integration of electric vehicles enabling V2G and G2V systems. 154, 245-256.

Musirin, I. and Rahman, T. A. (2002). Novel fast voltage stability index (FVSI) for voltage stability analysis in power transmission system. Paper presented at the Student Conference on Research and Development.Journal, 265-268.

Muthukumar, K. and Jayalalitha, S. J. A. S. C. (2017). Integrated approach of network reconfiguration with distributed generation and shunt capacitors placement for power loss minimization in radial distribution networks. 52, 1262-1284.

Nadu, T. (2018). A Review on Smart Grid and its Application.

Nara, K., Hayashi, Y., Ikeda, K. and Ashizawa, T. (2001). Application of tabu search to optimal placement of distributed generators. Paper presented at the 2001 IEEE Power Engineering Society Winter Meeting. Conference Proceedings (Cat. No. 01CH37194).Journal, 2, 918-923.

Nguyen, T. P., Vo, D. N. J. N. C. and Applications. (2019). Improved stochastic fractal search algorithm with chaos for optimal determination of location, size, and quantity of distributed generators in distribution systems. 31(11), 7707-7732.

Nizam, M., Mohamed, A. and Hussain, A. (2006). Dynamic voltage collapse prediction in power systems using power transfer stability index. Paper presented at the 2006 IEEE International Power and Energy Conference.Journal, 246-250.

Novoa, C. and Jin, T. (2011). Reliability centered planning for distributed generation considering wind power volatility. Electric power systems research, 81(8), 1654-1661.

Nyangon, J. (2017). Distributed energy generation systems based on renewable energy and natural gas blending: New business models for economic incentives, electricity market design and regulatory innovation. University of Delaware.

Ochoa, L. F., Dent, C. J. and Harrison, G. P. (2009). Distribution network capacity assessment: Variable DG and active networks. IEEE transactions on power systems, 25(1), 87-95.

Ochoa, L. F. and Harrison, G. P. (2010). Minimizing energy losses: Optimal accommodation and smart operation of renewable distributed generation. IEEE transactions on power systems, 26(1), 198-205.

Ochoa, L. F., Padilha-Feltrin, A. and Harrison, G. P. (2008a). Evaluating distributed time-varying generation through a multiobjective index. IEEE transactions on power delivery, 23(2), 1132-1138.

Ochoa, L. F., Padilha-Feltrin, A. and Harrison, G. P. (2008b). Time-series-based maximization of distributed wind power generation integration. IEEE Transactions on Energy conversion, 23(3), 968-974.

Othman, M. M., Hegazy, Y. and Abdelaziz, A. Y. J. I. E. E. J. (2015). A Review of virtual power plant definitions, components, framework and optimization. 6(9), 2010-2024.

Pandi, V. R., Zeineldin, H. and Xiao, W. (2012). Determining optimal location and size of distributed generation resources considering harmonic and protection coordination limits. IEEE transactions on power systems, 28(2), 1245-1254.

Papari, B. (2018). Intelligent Energy and Operation Management of AC, DC and Hybrid Microgrids Based on Evolutionary Techniques.

Parhizi, S., Lotfi, H., Khodaei, A. and Bahramirad, S. J. I. A. (2015). State of the art in research on microgrids: A review. 3, 890-925.

Petinrin, J., Shaabanb, M. J. R. and Reviews, S. E. (2016). Impact of renewable generation on voltage control in distribution systems. 65, 770-783.

Polster, S. and Renner, H. J. C.-O. A. P. J. (2017). Voltage stability monitoring methods for distribution grids using the Thevenin impedance. 2017(1), 1535-1539.

Pontryagin, L. S. (2018). Mathematical theory of optimal processes: Routledge.

Popović, D., Greatbanks, J., Begović, M. and Pregelj, A. (2005). Placement of distributed generators and reclosers for distribution network security and reliability. International Journal of Electrical Power & Energy Systems, 27(5-6), 398-408.

Porkar, S., Poure, P., Abbaspour-Tehrani-fard, A. and Saadate, S. (2011). Optimal allocation of distributed generation using a two-stage multi-objective mixed-integer-nonlinear programming. European transactions on electrical power, 21(1), 1072-1087.

Prakash, P., Khatod, D. K. J. R. and Reviews, S. E. (2016). Optimal sizing and siting techniques for distributed generation in distribution systems: A review. 57, 111-130.

Prommee, W. and Ongsakul, W. (2011). Optimal multiple distributed generation placement in microgrid system by improved reinitialized social structures particle swarm optimization. European transactions on electrical power, 21(1), 489-504.

Quadri, I. A., Bhowmick, S. and Joshi, D. J. A. e. (2018). A comprehensive technique for optimal allocation of distributed energy resources in radial distribution systems. 211, 1245-1260.

Rahman, T. A. and Jasmon, G. (1995). A new technique for voltage stability analysis in a power system and improved loadflow algorithm for distribution network. Paper presented at the Proceedings 1995 International Conference on Energy Management and Power Delivery EMPD'95.Journal, 2, 714-719.

Rao, R. S., Ravindra, K., Satish, K. and Narasimham, S. (2012). Power loss minimization in distribution system using network reconfiguration in the presence of distributed generation. IEEE transactions on power systems, 28(1), 317-325.

Raoofat, M. (2011). Simultaneous allocation of DGs and remote controllable switches in distribution networks considering multilevel load model. International Journal of Electrical Power & Energy Systems, 33(8), 1429-1436.

Rau, N. S. and Wan, Y.-h. (1994). Optimum location of resources in distributed planning. IEEE transactions on power systems, 9(4), 2014-2020.

Razavi, S.-E., Rahimi, E., Javadi, M. S., Nezhad, A. E., Lotfi, M., Shafie-khah, M., . . . Reviews, S. E. (2019). Impact of distributed generation on protection and voltage regulation of distribution systems: A review. 105, 157-167.

Renders, J.-M. and Bersini, H. (1994). Hybridizing genetic algorithms with hill-climbing methods for global optimization: two possible ways. Paper presented at the Proceedings of the First IEEE Conference on Evolutionary Computation. IEEE World Congress on Computational Intelligence.Journal, 312-317.

Ricciardelli, R. and Peters, A. M. (2017). After Prison: Navigating employment and reintegration: Wilfrid Laurier Univ. Press.

Rotaru, F., Chicco, G., Grigoras, G. and Cartina, G. (2012). Two-stage distributed generation optimal sizing with clustering-based node selection. International Journal of Electrical Power & Energy Systems, 40(1), 120-129.

Sadigh, A. K. (2014). Preparation of Power Distribution System for High Penetration of Renewable Energy Part I. Dynamic Voltage Restorer for Voltage Regulation Pat II. Distribution Circuit Modeling and Validation. University of California, Irvine.

Sahari, S., Abidin, A. F. and Rahman, T. A. (2003). Development of artificial neural network for voltage stability monitoring. Paper presented at the Proceedings. National Power Engineering Conference, 2003. PECon 2003.Journal, 37-42.

Salimans, T., Ho, J., Chen, X., Sidor, S. and Sutskever, I. J. a. p. a. (2017). Evolution strategies as a scalable alternative to reinforcement learning.

Samuel, I. A., Katende, J., Awosope, C. O. and Awelewa, A. A. J. I. J. o. A. E. R. (2017). Prediction of voltage collapse in electrical power system networks using a new voltage stability index. 12(2), 190-199.

Sapari, N., Mokhlis, H., Laghari, J. A., Bakar, A., Dahalan, M. J. R. and Reviews, S. E. (2018). Application of load shedding schemes for distribution network connected with distributed generation: A review. 82, 858-867.

Schauder, C., Gernhardt, M., Stacey, E., Lemak, T., Gyugyi, L., Cease, T. and Edris, A. (1995). Development of a/spl plusmn/100 MVAr static condenser for voltage control of transmission systems. IEEE transactions on power delivery, 10(3), 1486-1496.

Shaaban, M. F., Atwa, Y. M. and El-Saadany, E. F. (2012). DG allocation for benefit maximization in distribution networks. IEEE transactions on power systems, 28(2), 639-649.

Shahidehpour, M. and Alomoush, M. (2017). Restructured electrical power systems: Operation: Trading, and volatility: CRC Press.

Shukla, T., Singh, S., Srinivasarao, V. and Naik, K. (2010). Optimal sizing of distributed generation placed on radial distribution systems. Electric Power Components and Systems, 38(3), 260-274.

Simpson-Porco, J. W., Dörfler, F. and Bullo, F. J. I. T. o. A. C. (2016). Voltage stabilization in microgrids via quadratic droop control. 62(3), 1239-1253.

Singh, A., Parida, S. J. R. and Reviews, S. E. (2018). A review on distributed generation allocation and planning in deregulated electricity market. 82, 4132-4141.

Singh, D., Misra, R. and Singh, D. (2007). Effect of load models in distributed generation planning. IEEE transactions on power systems, 22(4), 2204-2212.

Singh, D., Singh, D. and Verma, K. (2009). Multiobjective optimization for DG planning with load models. IEEE transactions on power systems, 24(1), 427-436.

Singh, P., Meena, N. K., Yang, J., Vega-Fuentes, E. and Bishnoi, S. K. J. A. E. (2020). Multi-criteria decision making monarch butterfly optimization for optimal distributed energy resources mix in distribution networks. 278, 115723.

Singh, R. and Goswami, S. (2009). Optimum siting and sizing of distributed generations in radial and networked systems. Electric Power Components and Systems, 37(2), 127-145.

Singh, R. K. and Goswami, S. (2010). Optimum allocation of distributed generations based on nodal pricing for profit, loss reduction, and voltage improvement including voltage rise issue. International Journal of Electrical Power & Energy Systems, 32(6), 637-644.

Singh, R. K. and Goswami, S. (2011). Multi-objective optimization of distributed generation planning using impact indices and trade-off technique. Electric Power Components and Systems, 39(11), 1175-1190.

Smon, I., Verbic, G. and Gubina, F. (2006). Local voltage-stability index using Tellegen's theorem. IEEE transactions on power systems, 21(3), 1267-1275.

Soares, N., Martins, A., Carvalho, A., Caldeira, C., Du, C., Castanheira, É., . . . Reviews, S. E. (2018). The challenging paradigm of interrelated energy systems towards a more sustainable future. 95, 171-193.

Soroudi, A. and Ehsan, M. (2011). Efficient immune-GA method for DNOs in sizing and placement of distributed generation units. European transactions on electrical power, 21(3), 1361-1375.

Souxes, T., Granitsas, I.-M. and Vournas, C. J. E. P. S. R. (2019). Effect of stochasticity on voltage stability support provided by wind farms: Application to the Hellenic interconnected system. 170, 48-56.

Subramani, C., Dash, S., Bhaskar, M. A., Jagadeeshkumar, M., Sureshkumar, K. and Parthipan, R. (2009). Line outage contingency screening and ranking for voltage stability assessment. Paper presented at the 2009 International Conference on Power Systems.Journal, 1-5.

Sultana, S., Roy, P. K. J. I. J. o. E. P. and Systems, E. (2014). Multi-objective quasi-oppositional teaching learning based optimization for optimal location of distributed generator in radial distribution systems. 63, 534-545.

Sultana, U., Khairuddin, A. B., Aman, M., Mokhtar, A., Zareen, N. J. R. and Reviews, S. E. (2016). A review of optimum DG placement based on minimization of power losses and voltage stability enhancement of distribution system. 63, 363-378.

Tamimi, A. A., Pahwa, A. and Starrett, S. (2012). Effective wind farm sizing method for weak power systems using critical modes of voltage instability. IEEE transactions on power systems, 27(3), 1610-1617.

Ten, C.-W., Yamashita, K., Yang, Z., Vasilakos, A. V. and Ginter, A. J. I. T. o. S. G. (2017). Impact assessment of hypothesized cyberattacks on interconnected bulk power systems. 9(5), 4405-4425.

Teng, J.-H., Liu, Y.-H., Chen, C.-Y. and Chen, C.-F. (2007). Value-based distributed generator placements for service quality improvements. International Journal of Electrical Power & Energy Systems, 29(3), 268-274.

Thurner, L., Scheidler, A., Schäfer, F., Menke, J.-H., Dollichon, J., Meier, F., . . . Braun, M. J. I. T. o. P. S. (2018). Pandapower—An open-source python tool for convenient modeling, analysis, and optimization of electric power systems. 33(6), 6510-6521.

Tiwari, R., Niazi, K. and Gupta, V. (2012). Line collapse proximity index for prediction of voltage collapse in power systems. International Journal of Electrical Power & Energy Systems, 41(1), 105-111.

Tran, M. T. (2009). Definition and implementation of voltage stability indices in PSS® NETOMAC.

Verbic, G. and Gubina, F. (2004). A new concept of voltage-collapse protection based on local phasors. IEEE transactions on power delivery, 19(2), 576-581.

Vinothkumar, K. and Selvan, M. (2011). Fuzzy embedded genetic algorithm method for distributed generation planning. Electric Power Components and Systems, 39(4), 346-366.

Vinothkumar, K. and Selvan, M. (2012). Distributed generation planning: A new approach based on goal programming. Electric Power Components and Systems, 40(5), 497-512.

Vovos, P. N. and Bialek, J. W. (2005). Direct incorporation of fault level constraints in optimal power flow as a tool for network capacity analysis. IEEE transactions on power systems, 20(4), 2125-2134.

Vovos, P. N., Harrison, G. P., Wallace, A. R. and Bialek, J. W. (2005). Optimal power flow as a tool for fault level-constrained network capacity analysis. IEEE transactions on power systems, 20(2), 734-741.

Wang, C. and Nehrir, M. H. (2004). Analytical approaches for optimal placement of distributed generation sources in power systems. IEEE transactions on power systems, 19(4), 2068-2076.

Wang, L., Liu, Y. and Luan, Z. (2005). Power transmission paths based voltage stability assessment. Paper presented at the 2005 IEEE/PES Transmission & Distribution Conference & Exposition: Asia and Pacific.Journal, 1-5.

Wang, L. and Singh, C. (2008). Reliability-constrained optimum placement of reclosers and distributed generators in distribution networks using an ant colony system algorithm. IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews), 38(6), 757-764.

Wang, X.-H. and Li, J.-J. (2004). Hybrid particle swarm optimization with simulated annealing. Paper presented at the Proceedings of 2004 International Conference on Machine Learning and Cybernetics (IEEE Cat. No. 04EX826).Journal, 4, 2402-2405.

Wang, Y., Li, W. and Lu, J. (2009). A new node voltage stability index based on local voltage phasors. Electric power systems research, 79(1), 265-271.

Wang, Z., Cui, B. and Wang, J. J. I. T. o. P. S. (2016). A necessary condition for power flow insolvability in power distribution systems with distributed generators. 32(2), 1440-1450.

Willis, H. L. (2000). Analytical methods and rules of thumb for modeling DG-distribution interaction. Paper presented at the 2000 Power Engineering Society Summer Meeting (Cat. No. 00CH37134).Journal, 3, 1643-1644.

Wiszniewski, A. (2007). New criteria of voltage stability margin for the purpose of load shedding. IEEE transactions on power delivery, 22(3), 1367-1371.

Wong, L. A., Ramachandaramurthy, V. K., Taylor, P., Ekanayake, J., Walker, S. L. and Padmanaban, S. J. J. o. E. S. (2019). Review on the optimal placement, sizing and control of an energy storage system in the distribution network. 21, 489-504.

Yazdani, A. and Iravani, R. (2010). Voltage-sourced converters in power systems (Vol. 39): Wiley Online Library.

Yong, J. Y., Ramachandaramurthy, V. K., Tan, K. M., Mithulananthan, N. J. R. and Reviews, S. E. (2015). A review on the state-of-the-art technologies of electric vehicle, its impacts and prospects. 49, 365-385.

Zeineldin, H. and El-Saadany, E. F. (2017). Protection coordination index enhancement considering multiple DG locations using FCL. IEEE transactions on power delivery, 32(1), 344-350.

Zhu, D., Broadwater, R. P., Tam, K.-S., Seguin, R. and Asgeirsson, H. (2006). Impact of DG placement on reliability and efficiency with time-varying loads. IEEE transactions on power systems, 21(1), 419-427.

Zhu, J. (2015). Optimization of power system operation: John Wiley & Sons.

Ziari, I., Ledwich, G., Ghosh, A. and Platt, G. (2013). Optimal distribution network reinforcement considering load growth, line loss, and reliability. IEEE transactions on power systems, 28(2), 587-597.

Zio, E., Delfanti, M., Giorgi, L., Olivieri, V., Sansavini, G. J. I. J. o. E. P. and Systems, E. (2015). Monte Carlo simulation-based probabilistic assessment of DG penetration in medium voltage distribution networks. 64, 852-860.

Zubo, R. H. (2019). Distribution Network Operation with High Penetration of Renewable Energy Sources. Joint Active/Reactive Power Procurement: A Market-Based Approach for Operation of Distribution Network. University of Bradford.

Zubo, R. H., Mokryani, G., Rajamani, H.-S., Aghaei, J., Niknam, T., Pillai, P. J. R. and Reviews, S. E. (2017). Operation and planning of distribution networks with integration of renewable distributed generators considering uncertainties: A review. 72, 1177-1198.