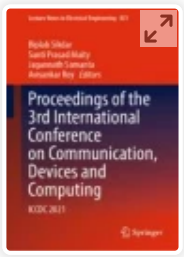


Conference proceedings | © 2022

Proceedings of the 3rd International Conference on Communication, Devices and Computing

ICCDC 2021

Editors: Biplab Sikdar, Santi Prasad Maity, Jagannath Samanta, Avisankar Roy

Provides insights into the 3rd International Conference on Communication, Devices and Computing (ICCDC 2021)

Includes original contributions in the areas of communication, devices, and computing

Presents research papers written by research engineers, scientists, industrialists, and scholars

Part of the book series: Lecture Notes in Electrical Engineering (LNEE, volume 851)

Sections

Table of contents (70 papers)

← Previous Page 3 of 4 Next →

Back to top ↑

About this book

This book provides insights into the 3rd International Conference on Communication, Devices and Computing (ICCDC 2021), which was held in Haldia, India, on August 16–18, 2021. It covers new ideas, applications, and the experiences of research engineers, scientists, industrialists, scholars, and students from around the globe. The proceedings highlight cutting-edge research on communication, electronic devices, and computing and address diverse areas such as 5G communication, spread spectrum systems, wireless sensor networks, and signal processing for secure communication, error control coding, printed antennas, analysis of wireless networks, antenna array systems, analog and digital signal processing for communication systems, frequency selective surfaces, radar communication,

and substrate integrated waveguide and microwave passive components, which are key to state-of-the-art innovations in communication technologies.

Back to top ↑

Keywords

Communication Technologies

Electronic Circuits and Devices

5G Communication

Wireless Sensor Networks

Radar Communication

Low Dimensional Devices

Bio-medical Electronics

Evolutionary Computing **ICCDC 2021**

Back to top ↑

Editors and Affiliations

Department of Communications and Networks, National University of Singapore, Singapore, Singapore
Biplab Sikdar

Department of Information Technology, Indian Institute of Engineering Science and Technology, Howrah, India
Santi Prasad Maity

Department of Electronics and Communication Engineering, Haldia Institute of Technology, Haldia, India
Jagannath Samanta, Avisankar Roy

Back to top ↑

About the editors

Professor Biplab Sikdar is Associate Professor in the Department of Electrical and Computer Engineering at the National University of Singapore. He received the B. Tech. degree in electronics and communication engineering from North Eastern Hill University, Shillong, India, in 1996, the M.Tech. degree in electrical engineering from the Indian Institute of Technology, Kanpur, India, in 1998, and the Ph.D. degree in electrical engineering from the Rensselaer Polytechnic Institute, Troy, NY, USA, in 2001. He was Assistant Professor from 2001–2007 and Associate Professor from 2007–2013 in the Department of Electrical, Computer, and Systems Engineering at Rensselaer Polytechnic Institute from 2001 to 2013. He is Recipient of the NSF CAREER award, the Tan Chin Tuan fellowship from NTU Singapore, the Japan Society for Promotion of Science fellowship, and the Leiv Eiriksson fellowship from the Research Council of Norway. His research interests include wireless MAC protocols, network security, and network performance evaluation. Dr. Sikdar is Member of Eta Kappa Nu and Tau Beta Pi. He served as Associate Editor for the IEEE Transactions on Communications from 2007 to 2012 and currently serves as Associate Editor for the IEEE Transactions on Mobile Computing.

Professor Santi P. Maity received his B.E. degree in Electronics and Communication Engineering from National Institute of Technology Durgapur and M.Tech. in Microwaves from the University of

Burdwan, India, in 1993 and 1997, respectively. He received his Ph.D. degree in Engineering from the Indian Institute of Engineering Science and Technology, Shibpur, India, in 2008. He received a couple of postdoctoral research positions from the institutes like Nanyang Technological University, Singapore, University of Vigo, Spain, and Supelec, France. He did postdoctoral work from January 2009 to July 2009 and February 2011 to July 2011 at the Laboratoire des Signauxet Systems (CNRS–Supelec–Universite Paris-Sud 11) in France. He is having more than 23 years (since 1997) teaching experiences at different academic institutions, and at present, he is working at Indian Institute of Engineering Science and Technology, Shibpur, India, since July 2000 as Professor in the Dept. of Information Technology. His research interests include cognitive radio cooperative spectral sensing, joint spectral sensing and secondary transmission, security, energy harvesting, relay-based routing in cognitive radio network, machine learning, and deep learning in medical image processing. He has published more than 280 research papers in international journals that include IEEE Transactions, IEEE Journals, IEEE Letters, Elsevier, Springer, Wiley, etc.

Dr. Jagannath Samanta is Associate Professor in the Department of Electronics & Communication Engineering at the Haldia Institute of Technology, Haldia, West Bengal, India. He received the B.Tech. and M.Tech. degree in Electronics and Communication Engineering from West Bengal University of Technology, West Bengal, India, in 2005 1nd 2008, respectively. Dr. Samanta received Gold Medal during M.Tech. degree. He received his Ph.D. (Tech) degree from the Institute of Radio Physics & Electronics in 2018. His research interests include digital VLSI design and error correcting codes. He has published more than 47 research papers in international journals that include IEEE Transactions, Springer etc. He is the reviewers of referred journal like IEEE Transactions, Springer, Elsevier, etc.

Dr. Avisankar Roy was born in Malda, WB, India, on 1984. He was felicitated with a Ph.D. in Engineering from University of Kalyani, WB, India, in the year of 2018. He has obtained his M. Tech. degree in Mobile Communication and Network Technology and B. Tech. degree in Electronics & Communication Engineering from West Bengal University of Technology (presently known as Maulana Abul Kalam Azad University of Technology), WB, India, in the year of 2009 and 2006, respectively.

He has almost 11 years of teaching experiences. He is currently working as Associate Professor at the Dept. of Electronics and Communication Engineering in Haldia Institute of Technology, Haldia, WB, India. He has contributed to numerous research articles in various journals, chapters, and conferences of repute. He was appointed as Reviewer of some SCI and SCOPUS indexed journals. His area of research interest includes microstrip antenna design and frequency selective surfaces.

Back to top ↑

Bibliographic Information

Book Title	Book Subtitle	Editors
Proceedings of the 3rd International Conference on Communication, Devices and Computing	ICCDC 2021	Biplab Sikdar, Santi Prasad Maity, Jagannath Samanta, Avisankar Roy
Series Title	**DOI**	**Publisher**
Lecture Notes in Electrical Engineering	https://doi.org/10.1007/978-981-16-9154-6	Springer Singapore
eBook Packages	**Copyright Information**	**Hardcover ISBN**

Engineering, Engineering (R0)	The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2022	978-981-16-9153-9

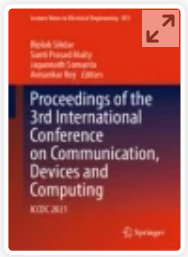
eBook ISBN	Series ISSN	Series E-ISSN
978-981-16-9154-6	1876-1100	1876-1119

Edition Number	Number of Pages	Number of Illustrations
1	XXII, 767	117 b/w illustrations, 320 illustrations in colour

Topics

Communications Engineering, Networks, Electronic Devices, Sensors and biosensors, Cloud Computing, Mobile Computing

Back to top ↑



Proceedings of the 3rd International Conference on Communication, Devices and Computing, pp 575–589

Optimum Power Flow Scheduling with Valve-Point Effects Using Barnacles Mating Optimization

Sunil Kumar Choudhary, Kamalika Tiwari & Santigopal Pain

Conference paper | First Online: 18 February 2022

Part of the Lecture Notes in Electrical Engineering book series (LNEE,volume 851)

Abstract

This article proposes one novel method based on barnacles mating optimization (BMO) to achieve power flow scheduling (PFS) problems by considering non-linearities such as valve-point effects on a thermal power unit. The multi-objective function of the problem is to attain a reduced generation cost for a short-term period, maintaining the system constraints. The paper proposes a detailed framework of the power flow scheduling (PFS) problem. Numerical analysis of the test systems is discussed to explain the usefulness of the BMO approach to obtain an optimal solution

of the PFS problem. The simulation results validate that BMO algorithm is well enough to provide lower economic cost than other meta-heuristic methods when various complex constraints in the problem of PFS are considered.

Keywords

Power flow scheduling (PFS)

Barnacles mating optimization (BMO)

Valve-point effect

Abbreviations

i, j: Index of thermal, hydro power unit respectively

C_t, F_t: Total cost, fuel cost respectively

$N_{\mathrm{t}}, N_{\mathrm{h}}$: Total no. of thermal, hydro units respectively

τ, T: Time sub-interval and Scheduling period respectively

u_{r}: Index of upstream reservoir

$Q_{hj,\tau}, I_{hj,\tau}$: Discharge and inflow rate of *j*th hydro unit τ respectively

$P_{ti,\tau}, P_{hj,\tau}$: Thermal and hydro of *i*th and *j*th at τ

$V_{hj,\tau}, S_{hj,\tau}$: Reservoir volume and spillage of *j*th hydro unit τ respectively

$P_{\mathrm{d},\tau}, P_{\mathrm{L},\tau}$: Total demand and transmission loss at τ

$\alpha_i, \beta_i, \gamma_i, \delta_i, \varepsilon_i$: Emission co-efficient of *i*th thermal unit

a_i, b_i, c_i, d_i: Fuel cost co-efficient of *i*th thermal unit

e_i, h_i: Co-efficient of the valve-point effect of *i*th thermal unit

Hydro power output co-efficient of *j*th hydro unit

$C_{\begin{pmatrix}1\\-6\end{pmatrix}j}$: $P_{ti}^{\min}, P_{ti}^{\max}$ Minimum and maximum power limit of *i*th thermal unit

$P_{hj}^{\min}, P_{hj}^{\max}$ Minimum and maximum power limit of *j*th hydro unit

$Q_{hj}^{\min}, Q_{hj}^{\max}$ Minimum and maximum discharge limit of *j*th hydro reservoir

$V_{hj}^{\min}, V_{hj}^{\max}$ Minimum and maximum volume limit of *j*th hydro reservoir

$V_{hj}^{\min}, V_{hj}^{\max}$ Minimum and maximum volume limit of *j*th hydro reservoir

$V_{hj}^{\text{begin}}, V_{hj}^{\text{end}}$ Initial and final storage volume of *j*th hydro reservoir

References

1. Mandal, K.K., Basu, M., Chakraborty, N.: Particle swarm optimization technique based short-term hydrothermal scheduling. Appl. Soft Comput. **8**(4), 1392–1399 (2008)

2. Sinha, N., Chakrabarti, R., Chattopadhyay, P.K.: Fast evolutionary programming techniques for short-term hydrothermal scheduling. IEEE Trans. Power Syst. **18**(1), 214–220 (2003)

3. Orero, S.O., Irving, M.R.: A genetic algorithm modelling framework and solution technique for

short term optimal hydrothermal scheduling. IEEE Trans. Power Syst. **13**(2), 501–518 (1998)

4. Hota, P.K., Barisal, A.K., Chakrabarti, R.: An improved PSO technique for short-term optimal hydrothermal scheduling. Electric Power Systems Research **79**(7), 1047–1053 (2009)

5. Sharma, K., Dubey, H.M., Pandit, M.: Short-Term Hydrothermal Scheduling Using Gray Wolf Optimization. Advances in Computing and Intelligent Systems, pp. 253–269. Springer, Singapore (2020)

6. Ganguly, D., Das, S., Hazra, A., Laddha, A., Basu, M.: Improved real coded genetic algorithm-based short-term hydrothermal generation planning. Int. J. Hybrid Intell. **1**(2–3), 118–146 (2019)

7. Wu, Y., Wu, Y., Liu, X.: Couple-based particle swarm optimization for short-term hydrothermal scheduling. Appl. Soft Comput. **74**, 440–450 (2019)

8. Das, S., Bhattacharya, A.: Symbiotic organisms search algorithm for short-term hydrothermal scheduling. Ain Shams Eng. J. **9**(4), 499–516 (2018)

9. Basu, M.: An interactive fuzzy satisfying method based on evolutionary programming technique for multi-objective short-term hydrothermal scheduling. Electr. Power Syst. Res. **69**(2–3), 277–285 (2004)

10. Amjady, N., Soleymanpour, H.R.: Daily hydrothermal generation scheduling by a new modified adaptive particle swarm optimization technique. Electr. Power Syst. Res. **80**(6), 723–732 (2010)

11. Hinojosa, V.H., Leyton, C.: Short-term hydrothermal generation scheduling solved with a mixed-binary evolutionary particle swarm optimizer. Electr. Power Syst. Res. **92**, 162–170 (2012)

12. Adoun, V.K., Gupta, N., Niazi, K.R., Swarnkar, A.: Economic emission short-term hydrothermal scheduling using a dynamically controlled particle swarm optimization. Res. J. Appl. Sci. Eng. Technol. **8**(13), 1544–1557 (2014)

13. Choudhary, S.K., Pain, S.: Modified Particle Swarm Optimization (MPSO)-Based Short-Term Hydro-Thermal-Wind Generation Scheduling Considering Uncertainty of Wind Energy. Innovations in Sustainable Energy and Technology, pp. 195–205. Springer, Singapore (2021)

14. Choudhary, S., Ghoshal, S.: Crisscross Optimization (CSO) Based Short-Term Conventional Generation Scheduling Incorporating Renewable Energy, pp. 213–218. MFIIS-2020, Kolkata (2021)

15. Sulaiman, M.H., Mustaffa, Z., Saari, M.M., Daniyal, H: Barnacles mating optimizer: a new bio-inspired algorithm for solving engineering optimization problems. Eng. Appl. Artif. Intell. **87**, 103330 (2020)

16. Khandeparker, L., Anil, A.C.: Underwater adhesion: the barnacle way. Int. J. Adhesion Adhesives **27**(2), 165–172 (2007)

Author information

Authors and Affiliations

Department of E.E., Dr. B.C. Roy Engineering College, Durgapur, West Bengal, India
Sunil Kumar Choudhary & Kamalika Tiwari

Department of E.E., Haldia Institute of Technplogy, Haldia, West Bengal, India
Santigopal Pain

Editor information

Editors and Affiliations

Department of Communications and Networks, National University of Singapore, Singapore, Singapore
Dr. Biplab Sikdar

Department of Information Technology, Indian Institute of Engineering Science and Technology, Howrah, India
Dr. Santi Prasad Maity

Department of Electronics and Communication Engineering, Haldia Institute of Technology, Haldia, West Bengal, India
Dr. Jagannath Samanta

Department of Electronics and Communication Engineering, Haldia Institute of Technology, Haldia, West Bengal, India
Dr. Avisankar Roy

Rights and permissions

Copyright information

About this paper

Cite this paper

Choudhary, S.K., Tiwari, K., Pain, S. (2022). Optimum Power Flow Scheduling with Valve-Point Effects Using Barnacles

Mating Optimization. In: Sikdar, B., Prasad Maity, S., Samanta, J., Roy, A. (eds) Proceedings of the 3rd International Conference on Communication, Devices and Computing. Lecture Notes in Electrical Engineering, vol 851. Springer, Singapore. https://doi.org/10.1007/978-981-16-9154-6_54

.RIS .ENW .BIB

DOI
https://doi.org/10.1007/978-981-16-9154-6_54

Published	Publisher Name	Print ISBN
18 February 2022	Springer, Singapore	978-981-16-9153-9

Online ISBN	eBook Packages
978-981-16-9154-6	Engineering Engineering (R0)