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

## ICCDC 2021

**Editors:** [Biplab Sikdar](#), [Santi Prasad Maity](#), [Jagannath Samanta](#), [Avisankar Roy](#)

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

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## About this book

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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.

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## Keywords

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**Communication Technologies**

**Electronic Circuits and Devices**

**5G Communication**

**Wireless Sensor Networks**

**Radar Communication**

**Low Dimensional Devices**

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Jagannath Samanta, Avisankar Roy

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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.

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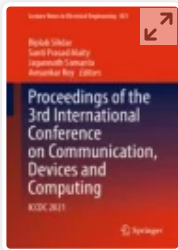
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## Optimum Power Flow Scheduling with Valve-Point Effects Using Barnacles Mating Optimization

[Sunil Kumar Choudhary](#), [Kamalika Tiwari](#) & [Santigopal Pain](#)

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### Abstract

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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**

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## Abbreviations

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

$C_t, :$  Total cost, fuel cost respectively  
 $F_t$

$N_t, :$  Total no. of thermal, hydro units respectively  
 $N_h$

$\tau, :$  Time sub-interval and Scheduling period  
 $T$  respectively

$u_r :$  Index of upstream reservoir

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

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

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

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

$P_{L, \tau}$   
 $\alpha_i, :$  Emission co-efficient of  $i$ th thermal  
 $\beta_i,$  unit  
 $\gamma_i,$

$\delta_i,$   $a_i, :$  Fuel cost co-efficient of  $i$ th  
 $\epsilon_i$   $b_i,$  thermal unit

$c_i,$   
 $d_i$   $e_i, :$  Co-efficient of the valve-  
 $h_i$  point effect of  $i$ th thermal

unit

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

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

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

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

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

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

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