Name: Dr. Shibendu Mahata

Department: Applied Electronics and Instrumentation Engineering

Contact Nos.: 9832724052

Qualifications: PhD

Designation: Asst. Professor (Level-I)

VIDWAN ID: 236291

Experience (Teaching / Research / Industry, in years): Teaching: 7 yrs, Research: 4.5 yrs, Industry: 0.5 yrs

Date of Joining at the Present Institution: 01/08/2012

Examinations Cleared: GATE (Rank: 55, Percentile: 98.61, Paper: Instrumentation, Year: 2008)

Qualifications Summary (Reverse chronological order):

Degree	Institute	From – To	Subjects
PhD	NIT Durgapur	2018-2021	Electronics and Communication
M.Tech	Jadavpur University	2008-2010	Instrumentation and Electronics
B.Tech	Dr. B.C. Roy Engineering College	2002-2006	Electronics and Instrumentation
AISSCE	DAV Model School	2002	Science
AISSE	DAV Model School	2000	General

Experience Summary (In chronological order):
Designation, Organization, Date From – Date To

1. Field Operations and Panel Engineer, Reliance Industries Ltd., Patalganga, Maharashtra, 22.08.2006-22.03.2007.

2. Project Assistant, Central Mechanical Engineering Research Institute, Durgapur, 01.07.2010-21.12.2010.

3. Research Scholar, IIT Kharagpur, 28.12.2010-31.07.2012.

3. Assistant Professor, Dr. B.C. Roy Engineering College, Durgapur, 01.08.2012-25.07.2018.

4. Research Scholar, Dept. of ECE, NIT Durgapur, 26.07.2018-till date (*on leave for PhD studies since 25.07.2018 from Dr. B.C. Roy Engineering College, Durgapur).

Specialization/Research Interest:

Fractional-order filters, circuits, and systems; signal processing; optimization

Awards & Recognitions
Best paper/ scholarship/Position in university exam / awards while at industry/ other organizations etc.

1. 2019 Premium award for Best paper from IET Signal Processing.

2. Best paper award in IEEE International Conference on Computational Intelligence and Computing Research (ICCICR), Chennai, India, 15-17 December, 2016.

3. Best poster award in Research Scholars Day organized by Dept. of ECE, NIT Durgapur (18-20 July, 2019).

4. University Gold Medal for standing First in Masters of Technology in Instrumentation & Electronics Engineering of Jadavpur University for the year 2010.

5. Rank : 55 in GATE -2008 (Paper: IN (Instrumentation), Percentile: 98.61).

6. Second rank in M.Tech across all engineering disciplines for the year 2010 at Jadavpur University.

Courses taught:

B.Tech:

Analog Electronic Circuits (2 terms), Basic Electronics (2 terms), Microprocessors and Microcontrollers (2 terms), Sensors and Transducers (3 terms), Industrial Instrumentation, Analytical Instrumentation, Analog Electronic Circuits Lab (2 terms), Digital Electronic Circuits Lab, Basic Electronics Lab, Industrial Instrumentation Lab, Sensors and Transducers Lab (2 terms), Microprocessors and Microcontrollers Lab (2 terms), Electrical Measurement and Instrumentation Lab (2 terms), Electronic Instrumentation and Measurement Lab.

M.Tech:

Not Applicable

Online Mode of Teaching:
The Faculty member needs to specify the online teaching/ assessment method adopted. (Link to any faculty created resources for Lecture notes / PPT/ Video Lecture etc. in Google Drive /

Weblink etc)

Created videos for Industrial Instrumentation Lab:

https://www.youtube.com/watch?v=IRcsOLcK3Xc&t=8s
https://www.youtube.com/watch?v=UvUabRxuhb4&t=17s
https://www.youtube.com/watch?v=Mr9aj0ofJRc&t=23s
https://www.youtube.com/watch?v=71pZciQ68EU&t=6s
https://www.youtube.com/watch?v=kv84q-dRc1k
https://www.youtube.com/watch?v=4VKadGnc-bw&t=2s

Publications:

Journal:

1. **S. Mahata**, N. Herencsar, D. Kubanek, R. Kar, D. Mandal, I. Cem Goknar, "A fractional-order transitional Butterworth-Butterworth filters and its experimental validation", **IEEE Access**, vol. 129521-129827, 2021. DOI: 10.1109/ACCESS.2021.3114182.

2. **S. Mahata**, N. Herencsar, D. Kubanek, "Optimal approximation of fractional-order Butterworth filter based on weighted sum of classical Butterworth filters", **IEEE Access**, vol. 9, pp. 81097-81114, 2021. DOI: 10.1109/ACCESS.2021.3085515.

3. **S. Mahata**, R. Kar, D. Mandal, "Direct digital fractional-order Butterworth filter design using constrained optimization", **International Journal of Electronics and Communications (AEU)**, vol. 128, article no. 153511, pp. 1-26, 2021. DOI:10.1016/j.aeue.2020.153511.

4. **S. Mahata**, R. Kar, D. Mandal, "Optimal analog-to-digital transformation of fractional-order Butterworth filter using binomial series expansion with Al-Alaoui operator", **International Journal of Circuit Theory and Applications**, vol. 49, no. 1, pp. 44-79, 2021.

5. **S. Mahata**, R. Kar, D. Mandal, "Optimal design of lattice wave digital fractional-order Butterworth filter", **International Journal of Circuit Theory and Applications**, vol. 49, no. 1, pp. 213-220, 2021.

6. **S. Mahata**, R. Kar, D. Mandal, "Optimal modelling of (1+*a*) order Butterworth filter under the CFE framework", **Fractal and Fractional**, vol. 4, no. 4, 2020, DOI:10.3390/fractalfract4040055.

7. **S. Mahata**, R. Kar, D. Mandal, "Optimal approximation of asymmetric type fractional-order bandpass Butterworth filter using decomposition technique", **International Journal of Circuit Theory and Applications**, 2020, doi:10.1002/cta.2835.

8. **S. Mahata**, R. Kar, D. Mandal, "Comparative study of nature-inspired algorithms to design (1+*a*) and (2+*a*)-order filters using a frequency-domain approach", **Swarm and Evolutionary Computation**, vol. 55, article no. 100685, pp. 1-24, 2020, doi: 10.1016/j.swevo.2020.100685.

9. **S. Mahata**, R. Kar, D. Mandal, "Optimal rational approximation of bandpass Butterworth filter with symmetric fractional-order roll-off", **International Journal of Electronics and Communications (AEU)**, vol. 117, article no. 153106, pp. 1-21, 2020, https://doi.org/10.1016/j.aeue.2020.153106.

10. **S. Mahata**, R. Kar, D. Mandal, "Optimal approximation of fractional-order systems with model validation using CFOA", **IET Signal Processing**, vol. 13, no. 9, pp. 787-797, 2019.

11. **S. Mahata**, S. Banerjee, R. Kar, D. Mandal, "Revisiting the use of squared magnitude function for the optimal approximation of (1+a) order Butterworth filter", **International Journal of Electronics and Communications (AEU)**, vol. 110, article no. 152826, pp. 1-11, 2019, https://doi.org/10.1016/j.aeue.2019.152826

12. **S. Mahata**, S. Saha, R. Kar, D. Mandal, "Optimal integer-order rational approximation of a and $a+\beta$ fractional-order generalised analogue filters", **IET Signal Processing,** vol. 13, no. 5, pp. 516-527, 2019.

13. **S. Mahata**, R. Kar, D. Mandal, "Optimal fractional-order highpass Butterworth magnitude characteristics realization using current-mode filter", **International Journal of Electronics and Communications (AEU)**, vol. 102, pp. 78-89, 2019.

14. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "Approximation of fractional-order low pass filter", **IET Signal Processing**, vol. 13, no. 1, pp. 112-124, 2019.

15. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "A metaheuristic optimization approach to discretize the fractional order laplacian operator without employing a discretization operator", **Swarm and Evolutionary Computation**, vol. 44, pp. 534-545, 2019.

16. **S. Mahata,** S.K. Saha, R. Kar, D. Mandal, "Optimal design of wideband fractional order digital integrators using symbiotic organisms search algorithm", **IET Circuits, Devices & Systems**, vol. 12, no. 4, pp. 362-373, 2018.

17. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "Optimal design of fractional order digital differentiator using flower pollination algorithm", **Journal of Circuits, Systems and Computers**, vol. 27, no. 8, pp. 1-35, 2018.

18. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "Improved IIR type fractional order digital integrators using cat swarm optimization", **Turkish Journal of Electrical Engineering and Computer Sciences**, vol. 26, no. 2, pp. 856-866, 2018.

19. **S. Mahata,** S.K. Saha, R. Kar, D. Mandal, "Accurate integer order rational approximation of fractional order low pass butterworth filter using a metaheuristic optimisation approach", **IET Signal Processing**, vol. 12, no. 5, pp. 581-589, 2018.

20. **S. Mahata,** S.K. Saha, R. Kar, D. Mandal, "Optimal design of fractional order low pass Butterworth filter with accurate magnitude response", **Digital Signal Processing**, vol. 72, no. C, pp. 96-114, 2018.

21. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "Optimal design of IIR digital FOI using IPSO", **International Journal of Electronics Letters**, vol. 6, no. 2, pp. 181-191, 2018.

22. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "Optimal design of wideband digital integrators and differentiators using hybrid flower pollination algorithm", **Soft Computing**, vol. 22, no. 11, pp. 3757-3783, 2018.

23. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "Optimal design of fractional-order digital integrators: an evolutionary approach", **Scientia Iranica**, vol. 25, no. 6, pp. 3604-3627, 2018.

24. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "Enhanced colliding bodies optimisation-based optimal design of wideband digital integrators and differentiators", **International Journal of Bio-Inspired Computation,** vol. 9, no. 3, pp. 165-181, 2017.

25. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "Optimal and accurate design of fractional order digital differentiator – an evolutionary approach", **IET Signal Processing**, vol. 11, no. 2, pp. 181-196, 2017.

26. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "Optimal design of wideband digital integrators and differentiators using harmony search algorithm", **International Journal of Numerical Modelling: Electronic Networks, Devices and Fields**, 2016, doi: 10.1002/jnm.2203.

27. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "Optimal design of wideband infinite impulse response fractional order digital integrators using colliding bodies optimisation algorithm", **IET Signal Processing**, vol. 10, no. 9, pp. 1135-1156, 2016.

Conference:

1. **S. Mahata**, R. Chaudhury, R. Kar, D. Mandal, S.K. Saha, "Optimal integer order approximation of fractional order human ear simulator", in proceedings of the Fifteenth International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (IEEE ECTI-CON 2018), Chiang Rai, Thailand, 18-21 July, 2018, pp. 660-663.

2. **S. Mahata**, R. Kumar, R. Kar, D. Mandal, S.K. Saha, "Optimal design of recursive fullband digital fractional order differentiator", in proceedings of the Fifteenth International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (IEEE ECTI-CON 2018), Chiang Rai, Thailand, 18-21 July, 2018, pp. 668-671.

3. **S. Mahata**, A. Ghosh, R. Kar, D. Mandal, S.K. Saha, "Approximation of fractional order wood tissue impedance model using flower pollination algorithm", in proceedings of the Fifteenth International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (IEEE ECTI-CON 2018), Chiang Rai, Thailand, 18-21 July, 2018, pp. 664-667.

4. **S. Mahata**, R. Kar, D. Mandal, S.D. Roy, S.K. Saha, "Optimal digital rational approximation of fullband differentiator designed using adaptive gbest-guided gravitational search algorithm", in Proceedings of the IEEE Region 10 Conference (TENCON), Penang, Malaysia, 5-8 November, 2017, pp. 963-967.

5. **S. Mahata**, R. Kar, D. Mandal, S.K. Saha, "Optimal design of discrete rational approximation of the s^{α} operator without using a generating function", in Proceedings of the IEEE Region 10 Conference (TENCON), Penang, Malaysia, 5-8 November, 2017, pp. 1181-1184.

6. **S. Mahata**, R. Kar, D. Mandal, S.K. Saha, "A metaheuristic approach to design digital fractional order differentiator/integrator without employing any discretization operator", in Proceedings of the IEEE Region 10 Conference (TENCON), Penang, Malaysia, 5-8 November, 2017, pp. 3117-3122.

7. **S. Mahata**, S. Dhibar, R. Kar, D. Mandal, S.K. Saha, "Optimal design of fractional order digital differentiator using gravitational search algorithm", in Proceedings of the 5th International Electrical Engineering Congress (iEECON2017), Pattaya, Thailand, 8-10 March, 2017, pp. 1-4.

8. **S. Mahata**, R. Kar, D. Mandal, S.K. Saha, "Accurate design of digital rational approximations to the fractional order integrator using crow search algorithm", in Proceedings of the IEEE International Conference on Computational Intelligence and Computing Research (ICCICR), Chennai, India, 15-17 December, 2016, pp. 1-5.

9. **S. Mahata**, R. Kar, D. Mandal, S.K. Saha, "Efficient design of IIR fractional order digital integrators using craziness based particle swarm optimization", in Proceedings of the IEEE Region 10 Conference (TENCON), Singapore, 22-25 November, 2016, pp. 1175-1179.

10. **S. Mahata**, R. Kar, D. Mandal, S.K. Saha, "Accurate design of digital fractional order differentiators using improved particle swarm optimization", in Proceedings of the IEEE Region 10 Conference (TENCON), Singapore, 22-25 November, 2016, pp. 1171-1174.

Book:

Nil

Book Chapter:

1. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, N. Banerjee, "A heuristic approach to design discrete fractional order integrators without using *s*-to-*z* transform", Solid State Phenomena, vol. 261, pp. 386-393, 2017 (Publisher: Trans Tech Publications, Switzerland, Editors: A.P. Markopoulos & G.C. Vosniakos).

2. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "Discrete non-integer order differentiator models using moth-flame optimization algorithm", Solid State Phenomena, vol. 261, pp. 394-401, 2017 (Publisher: Trans Tech Publications, Switzerland, Editors: A.P. Markopoulos & G.C. Vosniakos).

3. **S. Mahata**, S.K. Saha, R. Kar, D. Mandal, "Infinite impulse response approximations to the non-integer order integrator using cuckoo search algorithm", Computer Information Systems and Industrial Management Lecture Notes in Computer Science, vol. 10244, pp. 548-556, 2017 (Publisher: Springer, Cham, Editors: K. Saeed, W. Homenda, & R. Chaki).

Supervision of Ph.D/M.Tech / B.Tech Projects:

For Ph.D

Nil

B.Tech Projects:

1. Kalyanasis Sahu; "VHDL based implementation of memory BIST", 2013.

2. Debdutta Biswas, Annasha Saha, Indrani Biswas; "Linearization and software compensation of thermistor", 2014.

3. Jitu Kumar Sen; "Water level monitoring system", 2015.

4. Souhadri Mandal, Ravi Kumar; "Cold junction compensation of thermocouple using active devices", 2016.

5. Saikat, Patra, Suman Nag, Kaushal Kumar Jha; "Implementation of voice controlled robotic car", 2017.

Invited Lectures:

Nil

Participation in seminar/conference/symposium/workshop/discussion meeting

1. TEQIP-III sponsored technical colloquium, 5 days, 2019, Dept. of ECE, NIT Durgapur.
2. Seminar on 'How to write research papers', 1 day, 2018, Wiley Publications in collaboration with NIT Durgapur.
3. Workshop on 'Robotics using Arduino Uno', 1 day, 2016, SkillRex Technology.
4. Workshop on 'MSP430F5529 Launchpad', 2 days, 2016, Texas Instruments University Program.
5. Workshop on 'Overview of DCS and PLC', 5 days, 2015, Yokogawa India Pvt. Ltd.
6. Seminar on 'Recent Trends in Machine Intelligence, Data Mining and Soft Computing Techniques and its impact on research and development', 2 days, 2013, BCREC.

Participation in faculty development programmes

1. 'Data Analysis for Instrumentation System', face-to-face, IIT Kharagpur, 15.2.2019-21.02.2019, IIT Kharagpur.

2. 'Signals and Systems', online, IIT Kharagpur and IIT Bombay, 02.01.2014-12.01.2014, NPTEL at NIT Durgapur remote center.

3. 'Analog Electronics', online, IIT Kharagpur, 04.06.2013-14.06.2013, NPTEL at NIT Durgapur remote center.

Organization of events (Dr. B. C. Roy Engineering College)

1. Workshop on 'MSP430F5529 Launchpad' conducted by Texas Instruments University Program, 02.03.2016-03.03.2016.

Participation in administrative committees (selected)

1. Technical advisory committee member for up-gradation of Industrial Instrumentation, Sensors and Transducers, and Electronic Instrumentation and Measurement laboratories, 2017.

2. Coordinator for structuring the Course Outcomes (COs) and Program Educational Objectives (PEOs) as part of the requirement for NBA program for AEIE department, 2015.

3. Coordinator for BCREC Tech-Fest events for AEIE dept in 2015.

Project Ideas Submitted to Govt. Agencies/ On-going Projects / Research Ideas under preparation & execution

Nil

Membership of professional bodies: IEEE, IETE, IEI, CSI, MGMI etc.

Nil