PMRF-ISSS Teaching Programme

Prime Minister Research Fellowship students' teaching requirement facilitated by the Institute of Smart Structures and Systems

Module PMRF-ISSS037/2023

Mathematics for Communications

Name of the PMRF student

Sayantan Adhikary

Required background of the students taught

Student should have basic knowledge of the following subjects:
1. Probability and random process
2. Matrix theory
3. MATLAB coding

Online session coordinator

Will be chosen from the list of registrants

Image credits: www.istockphoto.com

Details of the content of the module

The course focuses on developing mathematical intuitions on communication systems and implementing them using MATLAB.

1. Signal space, uncoded signal sets (PSKs, FSKs, etc.), visualization of vector channels
2. ML decoder and its optimality, performance analysis of uncoded signal sets over AWGN channel
3. Characterization of wireless LTV channel, wide-band and narrow-band channels, effect of doppler
4. Optimal (ML) decoder design over fading channel and performance analysis
5. Performance analysis of multi-branch diversity, repetition code
6. Theory of generalized space-time codes, Alamouti code, VBLAST code
7. Wide-band fading channels, inter-symbol interference (ISI), introduction to orthogonal frequency division multiplexing (OFDM)
8. Channel modelling for SU-MIMO, MU-MIMO with linear transceivers
9. IEEE 802.15.4 Zigbee standard

Schedule of the module

- Start date: Oct. 03, 2023
- End date: Dec. 19, 2023 (Tentative)
- Class schedule: Tuesday, 5:00 PM - 8:00 PM (IST)
- additional classes for MATLAB coding(~15 hrs)
- Number of hours: 50 hours

Meeting link : Will be shared later

Link

Contact email ID: isss.forum@gmail.com

Registration link: Course-Registration-Link