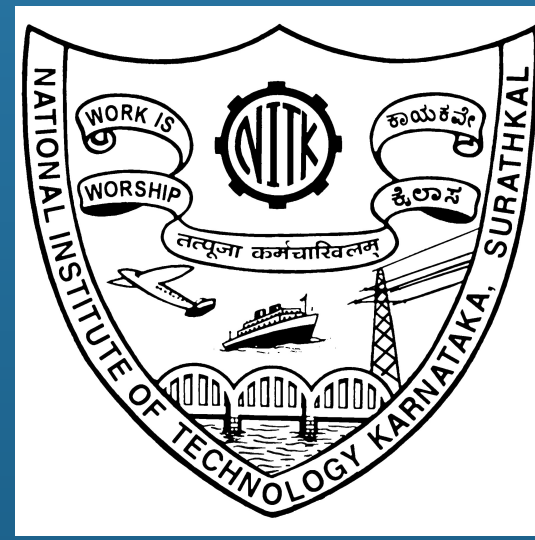




NITK-STEP PRESENTS

Five Series of Webinars on Introduction to Radar Systems jointly with Sri Shasha Prayathi Technologies Pvt. Ltd.

List of Webinars

- Webinar-1: Basics of radar systems- **Fourth (04)-Sixth (06), September, 2020.**
- Webinar-2: Radar Detection Fundamentals- **Eleventh(11)- Thirteenth(13), September, 2020.**
- Webinar-3: Matched filter, pulse compression and ambiguity function- **Nineteenth (19)- Twenty first (21), September, 2020.**
- Webinar-4: Frequency coded and phase coded radar waveforms- **Twenty fifth (25)- Twenty Seventh (27), September, 2020**
- Webinar-5: Signal models and radar data acquisition- **Second (02)- Fourth (04), October, 2020**

Registration fee

- Registration fee for all the webinars: Rs.2500/-

Certificate

- NITK-STEP will issue certificate for all the registered and attended participants.

The details of each of the webinars are described below



TO REGISTER PLEASE VISIT THE FOLLOWING LINK:

www.shashaprayathi.com/newsfeed

Webinar-1: Basics of radar systems- Forth (04)-Sixth (06), September, 2020

- **Day-1:** Introduction to radars, types of radars, pulsed radar operation, types of targets, slant range resolution, radar coordinates, azimuth and elevation angles, radar field of view, and multiple pulse integration, coherent and non coherent processing, ranging principle and problems associated with these concepts. **(2 Hours)**
- **Day-2:** Mono static pulsed radar block diagram and elements of a mono static radar and Doppler shift. The radar range equation (RRE). Various form of RREs (average form of RRE, pulse compression based RRE. C/Octave language based programming for these developed concepts and hands on experience. **(2 Hours)**
- **Day-3:** Search form of RRE, track form of RRE, dB form of RRE) and significance of SNR in radar systems. Problems based on these concepts. C/Octave language based programming for these developed concepts and hands on experience **(2 Hours)**

Learning outcomes

- To understand basics of radar systems
- To be able to code link budget analysis of various radar systems

Timing

- 5.30PM to 7.30PM

Webinar-2: Radar Detection fundamentals- Eleventh (11) - Thirteenth (13) September, 2020

- **Day-1:** Search mode fundamentals, track while scan, search and scan, overview of threshold detection concept. Probabilities of false alarm and detection. Signal plus noise pdf, Receiver operating characteristics (ROC) and fluctuating target models. **(2 Hours)**
- **Day-2 :** Neyman-pearson detection principle and its derivation. Octave based programming exercises and examples to appreciate the concepts learned **(2 Hours)**
- **Day-3:** Coherent detection and non coherent detection examples and associated problems. Octave based programming exercises and examples to appreciate the concepts learned. **(2 Hours)**

Learning outcomes

- To understand radar detection fundamentals
- To be able to code ROC curves of the radar.

Timing

- 5.30PM to 7.30PM

Webinar-3: Matched filter, pulse compression and ambiguity function- Eighteenth (18)- Twentieth (20) September, 2020

- **Day-1:** Basics of pulse compression, need for pulse compression trade off between energy and slant range resolution. Matched filter derivation and matched filter for simple pulse. Ambiguity function definition **(2 Hours)**
- **Day-2 :** Ambiguity function properties, Matched filter for burst of pulses. Octave based programming exercises and examples to appreciate the concepts learned. **(2 Hours)**
- **Day-3:** Ambiguity function for burst of pulses. Problems on matched filter and pulse compression. Octave based programming exercises and examples to appreciate the concepts learned **(2 Hours)**

COORDINATOR: DR. VENKATESHA PERUMAL, NITK-STEP

Mobile: 99808 61389, e-mail: bvperumal@nitk.edu.in

Learning outcomes

- Understand pulse compression, matched filter, and ambiguity function
- Able to code matched filter and ambiguity function in C/Octave programming

Timing

- 5.30 PM-7.30 PM

Webinar-4: Frequency coded and phase coded radar wave forms- Twenty Fifth (25)-Twenty Seventh (27), September, 2020

- **Day-1:** Linear frequency modulated (LFM) waveform, comparison with simple pulse range Doppler coupling, Doppler tolerance of LFM ambiguity functions of LFM. Need for reduction of delay and/ or Doppler side lobe reduction. Non Linear FM waveform **(2 Hours)**
- **Day-2:** phase coded waveforms, binary phase coded wave forms, binary Barker codes, Ambiguity function of binary Barker codes. Octave based programming exercises and examples to appreciate the concepts learned. **(2 Hours)**
- **Day-3:** Comparison between LFM and Barker-13 code. Poly Phase coded waveforms. Octave based programming exercises and examples to appreciate the concepts learned. **(2 Hours)**

Learning outcomes

- Understand pulse compression, matched filter, and ambiguity function.
- Able to code matched filter and ambiguity function in C/Octave programming.

Timing

- 5.30 PM-7.30 PM

Webinar-5: Signal models and radar data acquisition-Second (02)-Fourth (04), October, 2020

- **Day-1:** Radar range equations for volume targets, surface targets, beam limited case, and pulse limited case. Radar cross section, RCS modeling, swerling models, Doppler resolution. **(2 Hours)**
- **Day-2:** Radar data acquisition, data cube concept, slow time sampling rate, fast time sampling rate. Octave based programming exercises and examples to appreciate the concepts learned. **(2 Hours)**
- **Day-3:** spatial sampling rate, I/Q receiver, radar's receiver and associated problems. Octave based programming exercises and examples to appreciate the concepts learned. **(2 Hours)**

Learning outcomes

- Understand pulse compression, matched filter, and ambiguity function.
- Able to code matched filter and ambiguity function in C/Octave programming.

Timing

- 5.30 PM-7.30 PM