Coimbatore Institute of Technology, Coimbatore – 14.
(A Government Aided Autonomous Institution)

UGC sponsored
Faculty Development Programme

On

LINEAR ALGEBRA AND ITS APPLICATIONS IN SIGNAL PROCESSING

12th to 16th October, 2015

REPORT

An UGC Sponsored Faculty Development Programme on Linear Algebra and its applications in Signal Processing was conducted during 12th -16th Oct, 2015 by the department of Electronics and Communications Engineering, Coimbatore Institute of Technology, Coimbatore.

The goal of this FDP is to provide state-of-the-art research on Linear algebra and its applications in signal processing. This also provides a forum for academicians, students and researchers working in the emerging field of signal processing and its applications.

Day 1, 12th Oct 2015:

Session I, II, III, IV of this FDP has covered as an Introduction to linear algebra and its application in the area of signal processing, Pedagogic and Archeological Facts of Linear Algebra and the Mathematical issues like Sensing, Detection, Measurement, Generation , Simulation Characterizing, Representation, Manipulation, Extraction, interaction and challenges for DSP through Linear Algebra presented by the chief guest Dr. Ashok Rao Former Head, Network Project, CEDT, IISC, Bangalore

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Day2, 13th Oct 2015

Session I, II, III, IV of this FDP has covered the topic Singular value decomposition and its applications. In linear algebra, the singular value decomposition (SVD) is a factorization of a real or complex matrix. It has many useful applications in signal processing and statistics which include computing the pseudo inverse, least squares fitting of data, multivariable control, matrix approximation, and determining the rank, range and null space of a matrix presented by Dr. Arulalan Rajan , Asst. Professor, Dept. of ECE, NIT-K, Suratkal.

Day 3, 14th Oct 2015

Session I & II of this FDP has covered the topic MultiMate Signal Processing. In multirate digital signal processing, the sampling rate of a signal is changed in order to increase the efficiency of various signal processing operations. Decimation, or down-sampling, reduces the sampling rate, whereas expansion, or up-sampling, followed by interpolation increases the sampling rate and some applications are Up-sampling, various systems in digital audio signal processing often operate at different sampling rates. Decomposition of a signal into M components, Implementation of high-performance filtering operations Presented by
Dr. V. Krishnaveni, Associate Professor, PSG Tech, Coimbatore.

Session III of this FDP has covered the topic Decomposition and Least squares, In statistics and mathematics, linear least squares is an approach fitting a mathematical or statistical model to data in cases where the idealized value provided by the model for any data point is expressed linearly in terms of the unknown parameters of the model. The resulting fitted model can be used to summarize the data, to predict unobserved values from the same system, and to understand the mechanisms that may underlie the system and Solving of problems in least squares presented by Dr. K. S. Ramaswami, Professor & Head, Dept. of Mathematics, CIT, Coimbatore

Session IV of this FDP has covered the topic Filter Design for Signal Processing. Filtering is a class of signal processing, the defining feature of filters to complete or partial suppression of some aspect of the signal. Correlations can be removed for certain frequency components and not for others without having to act in the frequency domain, and also covered the classification of filters presented by Dr. T. Balakumaran Assistant Professor, Dept. of ECE, CIT, Coimbatore

Day 4, 15th Oct 2015

Session I-II this FDP has covered the topic Image De noising and Image Super resolution. Image noise may be caused by different intrinsic (i.e., sensor) and extrinsic (i.e., environment) conditions which are often not possible to avoid in practical situations. Therefore, image denoising plays an important role in a wide range of applications such as image restoration, visual tracking, image registration, image segmentation, and image classification, where obtaining the original image content is crucial for strong performance. While many algorithms have been proposed for the purpose of image denoising, the problem of image noise suppression remains an open challenge, especially in situations where the images are acquired under poor conditions where the noise level is very high. Super resolution (SR) is a class of techniques that enhance the resolution of an imaging system presented by Dr. V. R. Vijaykumar, Associate Professor, Dept. of ECE, Anna University, Coimbatore

Session III-IV this FDP has covered the topic Signal Processing Algorithms using Scilab. Scilab is a high-level, numerically oriented programming language. The language provides an interpreted programming environment, with matrices as the main data type. By using matrix-based computation, dynamic typing, and automatic memory management, many numerical problems may be expressed in a reduced number of code lines, as compared to similar solutions using traditional languages presented by Ms. B. Bhuvaneshwari & Ms. V. Gowripriyaa, Assistant Professor, Dept. of ECE, CIT, Coimbatore.

Day 5, 16th Oct 2015

Session I this FDP has covered the topic Antenna Arrays for Signal Processing. Array structure can be defined as a set of sensors that are spatially separated, e.g. antennas. The basic problem that we attend to solve by using array processing technique(s) is to: Determine number and locations of energy-radiating sources (emitters).Enhance the signal to noise ratio SNR "signal-to-interference-plus-noise ratio (SINR)".Track multiple moving sources presented by Mr. S. Mathivanan, Assistant Professor, Dept.of ECE, CIT, Coimbatore.

Session II this FDP has covered the topic Compressed Sensing and Applications. Conventional approaches to sampling signals or images follow Shannon's celebrated theorem: the sampling rate must be at least twice the maximum frequency present in the signal (the so-called Nyquist rate).Compressed Sensing (CS) theory asserts that one can recover certain signals and images from far fewer samples or measurements than traditional methods use, presented by

Dr. A. Rajeswari, Prof & Head, Dept. of ECE, CIT, Coimbatore