About the FDP

Linear algebra is undeniably the base for many fields of sciences such as Machine Learning, Deep Learning, Neural Networks, Supply Chain Management, Digital Signal Processing, Pattern Recognition, to name a few. Thus it has become mandatory for researchers and faculties to revise and be updated with this subject.

This FDP is mainly focused on brushing up the basics as well as bringing out the research being carried out around the globe about the applications in different domains. This FDP will introduce the basics of Linear Algebra at a post graduate level and also showcase applications currently being researched.

Both research scholars and faculties working in the linear algebra and its allied areas are welcome to participate. Highly motivated graduate students will also be permitted to attend.

What do we cover in the FDP?

[·] denotes the speaker name

1. Matrices, Vector Spaces [KMP]

   Elementary Row Operations – Gaussian Elimination – RREF – Inverse – Jordan Method – LDU factorization – Linear Model – Vector Space – Bases – Rank Nullity Theorem – Interpolation

2. Linear Transformation [PV]

   Linear transformation – Properties – Invertible Linear Transformation – Matrix of Linear Transformation – change of basis of matrix – Dual Space – Application in ODE

3. Eigenvalues & Eigenvectors [BD]

   Eigenvalues – Eigenvectors – Properties – Diagonalizability – Applications in Difference Equations

4. Spectral Theorem & Matrix Decomposition [AS]

   Symmetric Matrices – Normal Matrices – Jordon Canonical Form – Positive Definite/Semi Definite Matrices – Spectral Decomposition – Non-negative matrices – Singular Value Decomposition

5. Inner Product Space [PS]

   Inner product – Norm – Projection – Orthonormal basis – Orthogonal Transformations – Gram-Schmidt Process – QR decomposition

6. Numerical Linear Algebra [KCS]

   Numerical methods to approximate eigenvalues – Power Method – Greshgorin's theorem – Collatz Localization

7. Generalized Inverses and its applications [KMP]

   g-inverse – construction of g-inverses – Least square solutions – MP inverse – Problems

8. Applications in Graphs [KCS]

   Adjacency matrix and its characteristic polynomial

9. Further Applications [TP]

   Applications in Linear Complementarity Problem – Applications in Game Theory

Resource Persons

All speakers deliver lectures offline except Dr.KCS.

Dr. T. Parthasarathy [TP]
Department of Mathematics
CMI, Chennai

Dr. Arindama Singh [AS]
Department of Mathematics
IIT, Madras

Dr. K. Manjunatha Prasad [KMP]
Department of Data Science
MAHE, Manipal

Dr. K.C. Sivakumar [KCS]
Department of Mathematics
IIT Madras

Dr. Biswajit Deb [BD]
Department of Mathematics
SMIT, Sikkim

Dr. P. Vanchinathan [PV]
School of Advanced Sciences
VIT, Chennai

Dr. P. Sushmitha [PS]
School of Advanced Sciences
VIT, Chennai

VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

Faculty Development Program on

Linear Algebra and its Applications

February 27 - March 03, 2023

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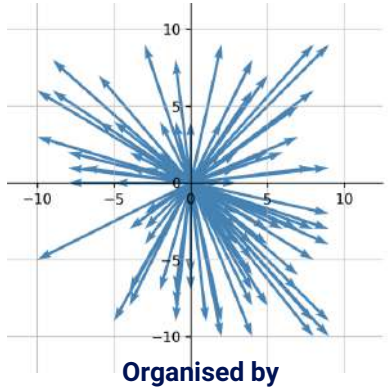
For motivated Research Scholars and Faculty



Organised by

Division of Mathematics
School of Advanced Sciences (SAS)
Vellore Institute of Technology, Chennai, INDIA

VIT – A Place to Learn; A Chance to Grow

About VIT

VIT has made a mark in the field of higher education in India imparting quality education in a multi-cultural ambience, intertwined with extensive application-oriented research. VIT was established with the aim of providing quality higher education at par with institutions of international standards. It persistently seeks and adopts innovative methods to improve the quality of higher education in all fields of science and technology. VIT was established by the well-known educationalist and former parliamentarian, honorable Dr. G. Viswanathan, the Founder and Chancellor, a visionary who transformed VIT into a Centre of excellence in higher technical education. VIT is ranked among the top 601-700 universities of the world and one among the top 3 institutions in India (Shangai ARWU Ranking 2022. It is ranked the 9th best university and 10th best research institution and the 12th best engineering institution in India (NIRF ranking, Govt. of India 2022). Engineering and technology subjects areas of VIT are the 346th best in the world and 9th best in India as per QS university rankings by Subject 2022. It is ranked within the top 200 universities in Asia (QS – Asia University rankings 2022) and has got A++ in the 4th cycle of NAAC accreditation.

Vellore Institute of Technology, Chennai

VIT Chennai is a globally engaged, competitive, comprehensive and research-enriched university campus strategically positioned in the capital city of Tamil Nadu, to respond to major industrial, social, economic and environmental demands and challenges. VIT Chennai is ably spearheaded by Vice Presidents, Mr. Sankar Viswanathan, Dr. Sekar Viswanathan, Mr. G.V. Selvam, Assistant Vice President Ms. Kadhambari S. Viswanathan, Vice Chancellor Dr. Rambabu Kodali, and Pro Vice Chancellor Dr. V.S. Kanchana Bhaaskaran. They share in the mission to make VIT a global center. The focus is to:

- Maximize the Industrial Connectivity.
- Create Centers of Excellence in niche areas of research.
- Enrich Technological and Managerial Human Capital nurtured in a multicultural ambience.
- Provide a common platform for the agglomeration of ideas of personnel from various walks of life for enriched learning.
- Foster International collaborations for mutual benefits in areas of research.

About the School

The School of Advanced Sciences (SAS) at VIT Chennai comprises Divisions of Mathematics, Physics and Chemistry. It offers Ph.D. in Physics, Chemistry, Mathematics, Geology, M.Sc. in Physics, Chemistry, Data Science and B.Sc. Mathematics & Computing along with a plethora of core and elective courses facilitating B.Tech., M.Tech., MCA, Management and Law programmes.

- ☑ Ph.D. - Physics/Chemistry/Mathematics/Geology
- ☑ M.Sc. - Physics/Chemistry/Data Science
- ☑ B.Sc. Mathematics & Computing

Registration

Interested participants must register and make the payment at https://vitchennaievents.com/ by selecting the event and appropriate category "Select Club → FDP → Linear Algebra applications-{Student, Scholar, Faculty}".

	Registration Fee	
	Physical	Virtual
Faculty (F)	₹ 1500	₹ 1500
Research Scholars (RS)	₹ 1200	₹ 1200
UG/PG students (S)	₹ 1000	₹ 1000
Foreign (F/RS/S)	$ 75	$ 75
VIT, Chennai (F/RS)	₹ 1000	NA

Foreign participants must transfer the money to the account details mentioned in the website https://vitlaa.in under Registration section and email the receipt to the organisers.

Last Date for Registration: **Feb 25, 2023**

For the online participants, Zoom link will be provided a day before and they are eligible E-certificates. Please visit https://www.vitlaa.in for any updates.

Accommodation

Accommodation for the participants will be arranged on payment basis inside the campus, if required. Depending on the funding availability, we may partially/fully waive off the accommodation charges.

Convenors

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