

Introduction to Linear Algebra

1. Linear Algebra I

An introduction to linear algebra, vector, matrix, Elementary operations of Matrices, general numerical approach to solving systems of equations, Matrices approach to solving systems of equations,

2. Linear Algebra II

Determinant, Gaussian elimination Method, Row Echelon Form, Reduced Row Echelon Form, Eigen values and Eigen vectors.

3. Permutations and Combinations

Fundamental Rules of Counting, Introduction to Probability, Examples.

4. Linear inequality

Linear Inequality (Graphical method), Introduction to Linear Programming Problem (Graphical method).

5. Curve fitting

Straight line fitting, Parabola (Polynomial) fitting, Exponential curve fitting.

Introduction to Programming

1. Overview of R, R as calculator
2. R data types and objects, functions, classes
3. Control structures, Loop functions (if, else)
4. Data Exploration functions in R (summary of data)
5. How to import data from various sources like SQL, Excel, csv formats to R
6. Visualization including Plots and Dashboards in R
7. Data Manipulation in R

Statistics and Probability

1. Foundation of Statistics

- What is Statistics?
- Population and Sample
- Types of measurements / Data
- Variables
- Categorical and Quantitative Variables
- Branches of Statistics
- Descriptive Statistics
- Inferential Statistics
- Exercises and applications

2. Descriptive Statistics

- Introduction

- Central Tendency
- Measures of Central Tendency
- Measures of Variation Dispersion
- Measures of Position
- Measures of Quality and Outliers
- Exercises and applications

3. Random Variables

- Probability Mass Function
- Probability Density Function (PDF)
- Cumulative Distribution Function (CDF)
- Expected Value

4. Probability Distributions - I

- Applications of concepts
- Bernoulli distribution
- Binomial Distribution
- Poisson distribution
- PDF / CDF / Using Functions in "R"
- Exercises and applications

5. Probability Distributions - II

- Normal Distribution
- Students T-Distribution
- Chi-square Distribution
- F-Distribution
- Applications of concepts

6. Estimation - I

- Sampling
- Sampling Methods
- Central Limit Theorem
- Point Estimation
- Sample Mean and Variance
- Exercises and applications

7. Estimation - II

- Interval Estimation
- Confidence Intervals
- Sample Size

- Application of concepts

8. Regression Analysis

- Types of Regression Analysis
- Linear Regression
- Multiple Regression
- Other Types of Regression
- Applications of concepts

9. Testing of Hypothesis - I

- Statistical Hypothesis - Fundamentals
- Steps in Hypothesis Testing
- Classical and p-value methods
- Exercises and applications

10. Testing of Hypothesis - II

- Hypothesis Testing - Proportions
- Hypothesis Testing - Means
- Hypothesis Testing - Variances
- Exercises and applications
- Programming with statistics

Advance Statistics

- ANOVA
- Chi-square test
- Time Series Analysis
- Factor analysis
- Principle Component analysis
- Discriminant analysis
- Exploratory Data Analysis
- Statistics quality control

Introduction to Machine Learning

Introduction Data Science, Data and Big data, Predictive Analysis, Machine Learning, Data Mining, Soft computing, Neural Network, Deep learning;

Introduction to Machine learning: Machine Learning Basics, how machines learn, Machine learning in practice, Types of Machine Learning

Machine Learning Algorithms

- 1) Linear regression
- 2) Logistic regression
- 3) Knn classification
- 4) k-means clustering
- 5) decision tree
- 6) random forest
- 7) gradient descent

Advanced Machine Learning

- 1) SVM
- 2) Naïve Bayes
- 3) Gradient boosting
- 4) Neural networks.

Natural Language Processing

- Introduction to NLP
- Tokenization, Morphology, Stemming
- POS Tagging
- Parsing
- Semantics, Representing and Understanding Meaning, Knowledge Representation
- Text classification and clustering algorithms
- First Order Logic, Inference
- Sentiment Analysis, Sentiment Lexicons
- Summarization
- Information Extraction
- Named entity recognition.
- String matching algorithms.
- Basics on Chatbot

Introduction to Deep Learning

- Tensor flow (Keras)
- Neural networks
- Image recognition
- Image classification

Cloud ML

- Azure ML studio.
- AWS machine learning.

Business Intelligence & Visualizations

- Qlik Sense.

Use Cases of Big Data

- Insights to participants on business applications and use cases in various functional areas like telecom, retail, ecommerce, airline, healthcare, and etc.

