

NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Mathematics - Basic Algebraic Geometry : Varieties, Morphisms, Local Rings, Function Fields

Subject Co-ordinator - Dr. T.E. Venkata Balaji

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

- Lecture 1 - What is Algebraic Geometry?
- Lecture 2 - The Zariski Topology and Affine Space
- Lecture 3 - Going back and forth between subsets and ideals
- Lecture 4 - Irreducibility in the Zariski Topology
- Lecture 5 - Irreducible Closed Subsets Correspond to Ideals Whose Radicals are Prime
- Lecture 6 - Understanding the Zariski Topology on the Affine Line; The Noetherian property in Topology and in Algebra
- Lecture 7 - Basic Algebraic Geometry
- Lecture 8 - Topological Dimension, Krull Dimension and Heights of Prime Ideals
- Lecture 9 - The Ring of Polynomial Functions on an Affine Variety
- Lecture 10 - Geometric Hypersurfaces are Precisely Algebraic Hypersurfaces
- Lecture 11 - Why Should We Study Affine Coordinate Rings of Functions on Affine Varieties ?
- Lecture 12 - Capturing an Affine Variety Topologically From the Maximal Spectrum of its Ring of Functions
- Lecture 13 - Analyzing Open Sets and Basic Open Sets for the Zariski Topology
- Lecture 14 - The Ring of Functions on a Basic Open Set in the Zariski Topology
- Lecture 15 - Quasi-Compactness in the Zariski Topology; Regularity of a Function at a point of an Affine Variety
- Lecture 16 - What is a Global Regular Function on a Quasi-Affine Variety?
- Lecture 17 - Characterizing Affine Varieties; Defining Morphisms between Affine or Quasi-Affine Varieties
- Lecture 18 - Translating Morphisms into Affines as k -Algebra maps and the Grand Hilbert Nullstellensatz
- Lecture 19 - Morphisms into an Affine Correspond to k -Algebra Homomorphisms from its Coordinate Ring of Functions
- Lecture 20 - The Coordinate Ring of an Affine Variety Determines the Affine Variety and is Intrinsic to it
- Lecture 21 - Automorphisms of Affine Spaces and of Polynomial Rings - The Jacobian Conjecture; The Punctured Plane
- Lecture 22 - The Various Avatars of Projective n -space
- Lecture 23 - Gluing $(n+1)$ copies of Affine n -Space to Produce Projective n -space in Topology, Manifold Theory
- Lecture 24 - Translating Projective Geometry into Graded Rings and Homogeneous Ideals
- Lecture 25 - Expanding the Category of Varieties to Include Projective and Quasi-Projective Varieties
- Lecture 26 - Translating Homogeneous Localisation into Geometry and Back
- Lecture 27 - Adding a Variable is Undone by Homogenous Localization - What is the Geometric Significance of this?
- Lecture 28 - Doing Calculus Without Limits in Geometry ?
- Lecture 29 - The Birth of Local Rings in Geometry and in Algebra

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- Lecture 30 - The Formula for the Local Ring at a Point of a Projective Variety Or Playing with Localisations
- Lecture 31 - The Field of Rational Functions or Function Field of a Variety - The Local Ring at the Generic Point
- Lecture 32 - Fields of Rational Functions or Function Fields of Affine and Projective Varieties and their Relationship
- Lecture 33 - Global Regular Functions on Projective Varieties are Simply the Constants
- Lecture 34 - The d-Uple Embedding and the Non-Intrinsic Nature of the Homogeneous Coordinate Ring of a Projective Variety
- Lecture 35 - The Importance of Local Rings - A Morphism is an Isomorphism if it is a Homeomorphism and Induces an Isomorphism of Local Rings
- Lecture 36 - The Importance of Local Rings - A Rational Function in Every Local Ring is Globally Regular
- Lecture 37 - Geometric Meaning of Isomorphism of Local Rings - Local Rings are Almost Global
- Lecture 38 - Local Ring Isomorphism, Equals Function Field Isomorphism, Equals Birationality
- Lecture 39 - Why Local Rings Provide Calculus Without Limits for Algebraic Geometry Pun Intended!
- Lecture 40 - How Local Rings Detect Smoothness or Nonsingularity in Algebraic Geometry
- Lecture 41 - Any Variety is a Smooth Manifold with or without Non-Smooth Boundary
- Lecture 42 - Any Variety is a Smooth Hypersurface On an Open Dense Subset