

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

NPTEL Video Course - Mathematics - NOC:Combinatorics

Subject Co-ordinator - Prof. Narayanan N

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Pigeonhole Principle
Lecture 2 - Dirichlet theorem and Erdos-Szekeres Theorem
Lecture 3 - Ramey theorem as generalisation of PHP
Lecture 4 - An infinite flock of Pigeons
Lecture 5 - Basic Counting - the sum and product rules
Lecture 6 - Examples of basic counting
Lecture 7 - Examples: Product and Division rules
Lecture 8 - Binomial theorem and bijective counting
Lecture 9 - Counting lattice paths
Lecture 10 - Multinomial theorem
Lecture 11 - Applying Multinomial theorem
Lecture 12 - Integer compositions
Lecture 13 - Set partitions and Stirling numbers
Lecture 14 - Stirling and Hemachandra recursions
Lecture 15 - Integer partitions
Lecture 16 - Young's diagram and Integer partitions
Lecture 17 - Principle of Inclusion and Exclusion
Lecture 18 - Applications of PIE
Lecture 19 - The twelvefold way
Lecture 20 - Inclusion exclusion: Linear algebra view
Lecture 21 - Partial Orders
Lecture 22 - Mobius Inversion Formula
Lecture 23 - Product theorem and applications of Mobius Inversion
Lecture 24 - Formal power series, ordinary generating functions
Lecture 25 - Application of Ordinary generating functions
Lecture 26 - Product of Generating functions
Lecture 27 - Composition of generating functions
Lecture 28 - Exponential Generating Function
Lecture 29 - Composition of EGF

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- Lecture 30 - Euler pentagonal number theorem
- Lecture 31 - Graphs - introduction
- Lecture 32 - Paths Walks, Cycles
- Lecture 33 - Digraphs and functional digraphs
- Lecture 34 - Componenets, Connectivity, Bipartite graphs
- Lecture 35 - Acyclic graphs
- Lecture 36 - Graph colouring
- Lecture 37 - Mycielski graphs
- Lecture 38 - Product of graphs
- Lecture 39 - Menger's theorem
- Lecture 40 - System of Distinct representatives
- Lecture 41 - Planar graphs
- Lecture 42 - Euler identity
- Lecture 43 - Map colouring problem - History
- Lecture 44 - The Discharging Method - Part 1
- Lecture 45 - The Discharging Method - Part 2
- Lecture 46 - Introduction to Group actions
- Lecture 47 - Colouring and symmetries - examples
- Lecture 48 - Bursides lemma
- Lecture 49 - Proof of Bursides lemma
- Lecture 50 - Polya's theorem
- Lecture 51 - Species of structures- definitions and examples
- Lecture 52 - Associated series and Product of species
- Lecture 53 - Species: Substitution and Derivative
- Lecture 54 - Species: Pointing and counting labelled trees
- Lecture 55 - Review and Further directions
- Lecture 56 - More on further topics
- Lecture 57 - Linear Algebra method: Ultra short introduction
- Lecture 58 - Probabilistic Method: Ultra short introduction