

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

NPTEL Video Course - Computer Science and Engineering - NOC:Parameterized Algorithms

Subject Co-ordinator - Prof. Neeldhara Misra

Co-ordinating Institute - IIT Gandhinagar, IMSC

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

Lecture 1 - Invitation to FPT
Lecture 2 - Formalizing FPT
Lecture 3 - Kernelization: High Degree Rule
Lecture 4 - Kernelization: d-Hitting Set
Lecture 5 - Kernelization: Crown Reduciton
Lecture 6 - Kernelization: Nemhauser-Trotter and Expansion Lemma
Lecture 7 - Introduction to Branching
Lecture 8 - Analyzing Recurrences
Lecture 9 - High-Degree Branching for FVS
Lecture 10 - Vertex Cover above LP
Lecture 11 - Applications of Vertex Cover above Matching
Lecture 12 - Iterative Compression I: Setting Up the Method
Lecture 13 - Iterative Compression II: Vertex Cover and Tournament Feedback Vertex Set
Lecture 14 - Iterative Compression III: Feedback Vertex Set and 3-Hitting Set
Lecture 15 - Iterative Compression IV: Odd Cycle Transversal
Lecture 16 - Introduction to Randomized Algorithms via a Simple Randomized FPT Algorithm for FVS
Lecture 17 - Color Coding for Longest Path
Lecture 18 - Chromatic Coding for Feedback Arc Set on Tournaments
Lecture 19 - Random Separation and Subgraph Isomorphism
Lecture 20 - Derandomization
Lecture 21 - Divide and Conquer and Separator
Lecture 22 - Towards Defining Treewidth
Lecture 23 - Treewidth and Constructing Treedecomposition of Few Graph Classes
Lecture 24 - Structural Properties of Treedecomposition and Win-Win
Lecture 25 - Nice Tree Decomposition and Algorithm for Max Weight Independent Set
Lecture 26 - Dynamic Programming Algorithm over graphs of Bounded Treewidth
Lecture 27 - FPT Appproximation Algorithm for Computing Tree Decomposition - Part 1
Lecture 28 - FPT Appproximation Algorithm for Computing Tree Decomposition - Part 2
Lecture 29 - FPT Appproximation Algorithm for Computing Tree Decomposition and Applications - Part 1

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- Lecture 30 - FPT Approximation Algorithm for Computing Tree Decomposition and Applications - Part 2
- Lecture 31 - Dynamic Programming Over Subsets for Set Cover
- Lecture 32 - Dynamic Programming Over Subsets for Steiner Tree
- Lecture 33 - ILP for Envy-Free Allocations and Lobbying
- Lecture 34 - ILP for Imbalance Parameterized by Vertex Cover
- Lecture 35 - Important Cuts: Basic
- Lecture 36 - Important Cuts: Enumeration and Bounds
- Lecture 37 - FPT Algorithm for Multiway Cut
- Lecture 38 - FPT Algorithm for Directed Feedback Edge Set
- Lecture 39 - Algebraic Techniques: Inclusion Exclusion (Coloring)
- Lecture 40 - Algebraic Techniques: Inclusion Exclusion (Hamiltonian Path)
- Lecture 41 - Algebraic Techniques: Matrix Multiplication
- Lecture 42 - Algebraic Techniques: Polynomial Method
- Lecture 43 - Matroids: Representative Sets
- Lecture 44 - Matroids: Representative Sets - Computation and Combinatorics
- Lecture 45 - Matroids: Representative Sets - Applications (Paths and Kernels)
- Lecture 46 - Matroids: Representative Sets - Applications (Directed Long Cycle)
- Lecture 47 - Reductions - An Introduction
- Lecture 48 - Reductions - Problems as Hard as Clique I (Clique on Regular Graphs)
- Lecture 49 - Reductions - Problems as Hard as Clique (PVC, MCC, MIS)
- Lecture 50 - Reductions - Problems as Hard as Clique (Dominating Set, Set Cover)