

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

NPTEL Video Course - Computer Science and Engineering - NOC:Computational Complexity Theory

Subject Co-ordinator - Prof. Raghunath Tewari

Co-ordinating Institute - IIT - Kanpur

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

Lecture 1 - Introduction
Lecture 2 - NP Completeness
Lecture 3 - SAT is NP-complete
Lecture 4 - More on NP completeness
Lecture 5 - Hierarchy Theorems
Lecture 6 - Introduction to Space Complexity
Lecture 7 - Savitch's Theorem
Lecture 8 - Immerman-Szelepcsenyi Theorem
Lecture 9 - Polynomial Hierarchy
Lecture 10 - A PSPACE Complete Problem
Lecture 11 - More on Polynomial Hierarchy
Lecture 12 - Alternating Turing Machines
Lecture 13 - Equivalence of Quantifier and Oracle Based Definitions of Polynomial Hierarchy
Lecture 14 - Boolean Circuits
Lecture 15 - Shannon's Theorem and Karp-Lipton-Sipser Theorem
Lecture 16 - Bounded Depth Circuit Classes
Lecture 17 - Kannan's Theorem
Lecture 18 - Probabilistic Complexity
Lecture 19 - StrongBPP and WeakBPP
Lecture 20 - One-sided and Zero-sided Error Probabilistic Complexity Classes
Lecture 21 - Error Reduction for BPP
Lecture 22 - BPP in PH and Logspace Randomized Classes
Lecture 23 - Valiant-Vazirani Theorem - I
Lecture 24 - Valiant-Vazirani Theorem - II
Lecture 25 - Amplified version of Valiant-Vazirani Theorem
Lecture 26 - Toda's Theorem - I
Lecture 27 - Toda's Theorem - II
Lecture 28 - Permanent and Determinant Functions
Lecture 29 - Permanent is hard for #P

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- Lecture 30 - Interactive Proofs
- Lecture 31 - Graph Non-Isomorphism is in $IP[2]$
- Lecture 32 - Set Lower Bound Protocol
- Lecture 33 - MA is in AM
- Lecture 34 - Sumcheck Protocol - I
- Lecture 35 - Sumcheck Protocol - II
- Lecture 36 - Parity not in AC0 - I
- Lecture 37 - Parity not in AC0 - II
- Lecture 38 - Circuits with Counters
- Lecture 39 - Communication Complexity - I
- Lecture 40 - PCP Theorem
- Lecture 41 - Communication Complexity - II