

Dean Rosenzweig

Hard Algorithmic Problems

30 hours

Complexity of algorithms and complexity classes. The classes P, NP and the Cook–Levin theorem. NP–complete problems. Polynomial time hierarchy. Approximative algorithms. The class PSPACE and Savitch’s theorem. PSPACE–complete problems. Alternating Turing machines, interactive proofs, Boolean circuits. Logarithmic time and space. Hierarchy theorems. Relativization, algorithms with oracles. The class EXPTIME. Probabilistic algorithms and probabilistic complexity classes.

The course is somewhat advanced, assuming the contents of the course Applied Logic.

Necessary text

Sipser, M., Introduction to the Theory of Computation, PWS 1997.

Recommended reading

Selman, A.L., Computability and Complexity Theory, Springer 2001

Papadimitriou, C.H., Computational Complexity, Addison–Wesley 1994.