

Summary: Lecture 9

Summary for the chapter 10.3. [1]

First part in more detail. Second part (total functions) read and summarize a little.

TODO

Function problems

Title
Content

- focus so far: languages deciding decision problems
- give *yes* or *no* as answer
- now: focus on finding a solution:
 - find satisfying truth assignment for a boolean expression
 - find optimal tour for TSP

→ function problems

TODO

Questions:

FP and FNP

FP
Content

FNP
Content

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TODO

Questions:

Reductions between function problems

Title
Content

- translate answers back to the original problem
- reduction is a pair (R, S) :
 - R translates input x to input x'
 - S translates result y' to result y

- A' is B there (A' does not exist on the slides)

TODO

Questions:

How to prove $FP = FNP$?

Title
Content

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TODO

Questions:

Computing a satisfying assignment bit by bit

Title
Content

- SAT' is a formula φ plus an assignment that satisfies φ
- assignment as clauses that connects the single variables or their negation with \wedge

TODO

Questions:

If $FP=FNP$ optimization problems become easy

Title
Content

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TODO

Questions:

Another argument

Title
Content

- cryptographic argument: if $P=NP$, no safe encoding exists

TODO

Questions:

Total FNP

Title
Content

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TODO

Questions:

References

- [1] Christos H. Papadimitriou. *Computational Complexity*. Addison-Wesley Publishing Company, 1994.