

Theory of Computation

Homework 2

Due: 2013/10/22

Problem 1 (10 points) Please show that $NP \subseteq PSPACE$.

Ans: According to Savitch's theorem, $NPSPACE \subseteq PSPACE$. By Theorem 23 on p. 222 of the slides, $NP \subseteq NPSPACE$. Hence, $NP \subseteq NPSPACE \subseteq PSPACE$. ■

Problem 2 (10 points) Please write $A \rightarrow (\neg C \wedge (A \rightarrow B))$ in conjunctive normal form (CNF).

Ans:

$$\begin{aligned} A \rightarrow (\neg C \wedge (A \rightarrow B)) &\iff A \rightarrow (\neg C \wedge (\neg A \vee B)) \\ &\iff \neg A \vee (\neg C \wedge (\neg A \vee B)) \\ &\iff (\neg A \vee \neg C) \wedge (\neg A \vee \neg A \vee B) \\ &\iff (\neg A \vee \neg C) \wedge (\neg A \vee B). \end{aligned}$$

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