书面作业第3次

说明：请标注清楚题号，每一部分开始均需要新起页面开始书写解答，请标示清楚题号，解答文档请以pdf格式的文件方式提交，文件命名方式为：书面作业第3次-班级-姓名.pdf。本次作业提交截止日期：10月18日（周一）晚10:00。学习愉快！

第1部分 基础

无

第2部分 理论（T5，T6选做）

T1. 教材P97. 题17 (2)(4)（即证明由原推理的前提与结论构造的蕴含式重言）.

T2. 教材P97. 题18 (1)(5).

T3. 用CP规则证明：

$A \to (B \to C)$，$(C \wedge D) \to E$，$\neg F \to (D \wedge \neg E) \Rightarrow A \to (B \to F)$.

T4. 用反证法证明：

$(A \to B) \wedge (C \to D)$，$(B \to E) \wedge (D \to F)$，$\neg(E \wedge F)$，$A \to C \Rightarrow \neg A$.

T5. Prove that the following rule, called the Destructive Dilemma rule(破坏性二难), can be derived from the original and derived proof rules.

Premises: $\neg C \vee \neg D$，$A \to C$，$B \to D$

Conclusion: $\neg A \vee \neg B$.

T6. Two students came up with the following different wffs to formalize the statement(命题) "If A then B else C."

$(A \wedge B) \vee (\neg A \wedge C)$.

$(A \to B) \wedge (\neg A \to C)$.

Prove that the two wffs are equivalent by finding formal proofs for the following two statements.

a. $((A \wedge B) \vee (\neg A \wedge C)) \to ((A \to B) \wedge (\neg A \to C))$.

b. $((A \to B) \wedge (\neg A \to C)) \to ((A \wedge B) \vee (\neg A \wedge C))$.

第3部分 应用（T2选做）

T1. 教材P98. 题19 (2)(3)(5).

T2. Consider the following argument that aims to prove that Superman does not exist.

If Superman were able and willing to prevent evil, he would do so. If Superman were unable to

prevent evil he would be impotent(虚弱无能); if he were unwilling to prevent evil he would be malevolent（邪恶）;Superman does not prevent evil; If superman exists he is neither malevolent nor impotent. Therefore Superman does not exist.