INF4171 / INF3170
Oblig 1

Delivery (~~2013-09-11T23:59~~) 2014-09-18T23:59

These exercises can be delivered electronically through Devilry (devilry.ifi.uio.no). The deadline is **September 18, at 23:59**. This is an individual exercise. Please list usernames of collaborators where appropriate.

Exercise 1

Let S be a proof system. A formula A is S-consistent if $\neg A$ is not provable in S. Which of the following statements are equivalent?

a. S is sound.

b. S is complete.

c. S is unsound.

d. S is incomplete.

e. There is a formula A such that both A and $\neg A$ is provable in S.

f. Every S-consistent formula is satisfiable.

g. There is an S-consistent formula which is not satisfiable.

h. Every satisfiable formula is S-consistent.

Proove your answers.

Exercise 2

Use a sequent calculus to either proove or provide a counter model for the following formulae.

a. $(P \rightarrow Q) \rightarrow (\neg P \rightarrow \neg Q)$

b. $(P \rightarrow Q) \rightarrow (Q \rightarrow P)$

c. $(P \rightarrow Q) \rightarrow (\neg Q \rightarrow \neg P)$

Norwegian translations

Completeness Kompletthet[1]

Contradiction Selvmotsigelse

Counter model Motmodell

Falsifiable Falsifiserbar

Propositional formula Utsagnslogisk formel

Propositional logic Utsagnslogikk

Satisfiable Oppfyllbar

Sequent Sekvent

Sequent calculus Sekventkalkyle

Soundness Sunnhet

Tautology Tautologi

Valid Gyldig

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[1]Here, completeness is translated to "kompletthet". In this setting, completeness refers to a calculus' ability to proove every valid formula. Where completeness refers to every sentence being either a tautology or a contradiction, completeness is translated "fullstendighet".