IN3070
IN4070

Autumn 2020

Exercises for the Course

Logic

Week 12



Exercise 12.1 (Intuitionistic Validity)

Prove, using the Kripke semantics and forcing relation, that the following formulae are valid in intuitionistic logic:

1. $p \to \neg\neg p$
2. $(p \wedge \neg q) \to \neg(p \to q)$
3. $(\exists x\, \neg p(x)) \to (\neg \forall x\, p(x))$

Exercise 12.2 (Intuitionistic Sequent Calculus)

Prove the validity of the three formulae in 12.1 using the intuitionistic sequent calculus LJ.

Exercise 12.3 (Intuitionistic Countermodel)

Show, using a falsifying J-structure, that the following formula is *not* valid in intutionistic logic:

$$\neg(p \wedge q) \to \neg p \vee \neg q$$

What happens if we try to prove the formula using LJ?