

Exercises for FFL, Fall 2017, sheet 10

Return Thursday Dec 7, in class.

Exercise 1. Here are some plain English sentences. They cannot be coded in FOL in natural ways, for a diversity of reasons (but they can be coded in other logical systems that are used in mathematics, AI and linguistics). For each of the sentences below, give a brief statement why you think formalizing the sentence in FOL cannot be properly done.

1. I am a human.
2. Peter loves everything about Anne.
3. Is this a car?
4. There exist infinitely many stars.

Exercise 2. Give a formal *semantic* proof (proof of soundness as done in the LN for some of the basic rules of the sequent calculus) of the *chain* rule

$$\frac{\begin{array}{l} \Gamma \quad \psi \\ \Gamma \quad \psi \quad \varphi \end{array}}{\Gamma \quad \varphi}$$

Exercise 3. Give a derivation of the following rule:

$$\frac{}{(\varphi \vee \neg \varphi)}$$

in the sequent calculus!