

In addition to the below given problems, kindly study Chapter 10 in the lecture notes. Referenced problems can also be found there. In the lecture only marked problems will be discussed; for solutions to the other problems please contact Georg Moser.

1. Problem 8.2 (\*)

2. Consider the clause set:

$$\mathcal{C}_1 = \{P(a), \neg P(x) \vee P(f(x)), \neg P(f(x)) \vee Q(y), \neg Q(g(x, x))\}.$$

a) Provide a Herbrand interpretation  $\mathcal{I}$  that falsifies the set  $\mathcal{C}_1$ , that is  $\mathcal{I} \not\models \mathcal{C}_1$ .

b) Does there exist a Herbrand model for  $\mathcal{C}_1$ ?

3. Consider the clause set:

$$\mathcal{C}_2 = \{P(x) \vee Q(f(a)), \neg P(x) \vee Q(x), P(f(x)) \vee \neg Q(y), \neg P(x) \vee \neg Q(f(a))\}.$$

Give a closed semantic tree for  $\mathcal{C}_2$ .

4. Consider the clause set:

$$\mathcal{C}_3 = \{P(x, f(x)), \neg P(a, f(x)) \vee R(x), \neg R(x)\}.$$

Give a closed semantic tree for  $\mathcal{C}_3$ .

5. Consider the clause set:

$$\mathcal{C}_4 = \{P(h(x, h(a, b))), \neg P(h(x, x))\}.$$

Give a closed semantic tree for  $\mathcal{C}_4$ . (\*)

6. Problem 10.1. (\*)