Assignment sheet 5

Künstliche Intelligenz

Benzmüller & Schommer Summer 2019

Exercise 14: Further Modal Logic Exercises

Show that the following propositional modal logic formulas are valid:

- $(\Diamond p \wedge \Box(p \Rightarrow q)) \Rightarrow \Diamond q$ (in logic K)
- $\Box\Diamond\Box\Diamond p \Leftrightarrow \Box\Diamond p$ (in logic S4)
- $\Diamond\Diamond p \Leftrightarrow \Diamond p$ (in logic S4)
- $\Diamond\Box p \Leftrightarrow \Box p$ (in logic S5)

Exercise 15: Unification

Are the following terms unifiable (the variable symbols are x, y, z, u, v)? If yes, what is their most general unifier?

- $f(x, g(a), g(z))$ and $f(g(y), g(y), g(g(x)))$
- $f(x, g(x), g(z))$ and $f(g(y), g(y), g(g(x)))$
- $f(x, y, z)$ and $f(u, h(v, v), u)$
- $f(x, g(y, z), y, b)$ and $f(g(h(a, v), y), x, h(a, u), u)$