HW1

Dev Goyal

February 2023

1 Problem 1

We're required to prove $(p \wedge (p \to q) \to q)$ using resolution.

We will prove this by showing that the resolution of $(p \wedge (p \to q)) \wedge (\neg q)$ is unsatisfiable.

We will now convert the expression to CNF.

- replace $p \to q$ with $\neg p \vee q$
- the expression is now $(p \wedge \neg p \vee q) \wedge \neg q$

we can now apply resolution to the expression. We see that RHS contains q and LHS contains $\neg q$ so we can apply resolution to get an empty clause. Hence the expression is unsatisfiable. and thus the original expression is valid.