

Computability and Logic

HW 2

Due: Friday, February 20

1. Consider the following argument:

$$\begin{aligned} & B \wedge (H \vee Z) \\ & \neg Z \rightarrow K \\ & (B \leftrightarrow Z) \rightarrow \neg Z \\ & \neg K \\ & \therefore M \wedge N \end{aligned}$$

Demonstrate this argument to be valid using each of the following methods:

- Resolution
- Davis-Putnam (using clauses)
- David-Putnam (using original statements, i.e. not putting them into CNF first)
- Formal Proof (using Fitch)
- Existential Graphs

In each case, clearly indicate the steps you are going through. Do not take short-cuts: stick to the rules of the method! For Resolution and David-Putnam using clauses: you can use elimination strategies (e.g. subsumption and pure literal) to reduce your initial clause set. For Resolution, please use the resolution graph notation. For Davis-Putnam: use the tree notation ... and you can close a branch as soon as you get an empty clause or a False. For Formal Proofs: you have to use Fitch. Print out the Fitch proofs or put the files in a .zip file (my mail server blocks .prf files for some reason) and email directly to me. For Existential Graphs: use any medium you want: paper, powerpoint, Flash, etc.

2. Same as 1, but for the following argument:

$$\begin{aligned} & M \rightarrow (K \rightarrow B) \\ & \neg K \rightarrow \neg M \\ & L \wedge M \\ & \therefore B \end{aligned}$$