Semantic tableaux

BULAT JACLINA-IANA


Chapters
CHAPTER 1 : THEORY
CHAPTER 2 : SOLUTION
CHAPTER 3 : CONCLUSION

CHAPTER 1

THEORY

Theory of Semantic Tableaux

We use the semantic tableaux method when we need to use a SEMANTIC PROOF METHOD with a PROPOSITIONAL/PREDICATE LOGIC and it is classified as a REFUTATION PROOF METHOD

It was adapted to nonstardad logics and it is based on semantic considerations, it aims to decide consistency and to find all the models of a formula by decomposing it into subformulas

The validity of a formula is proved by CONTRADICTION -> refutation method

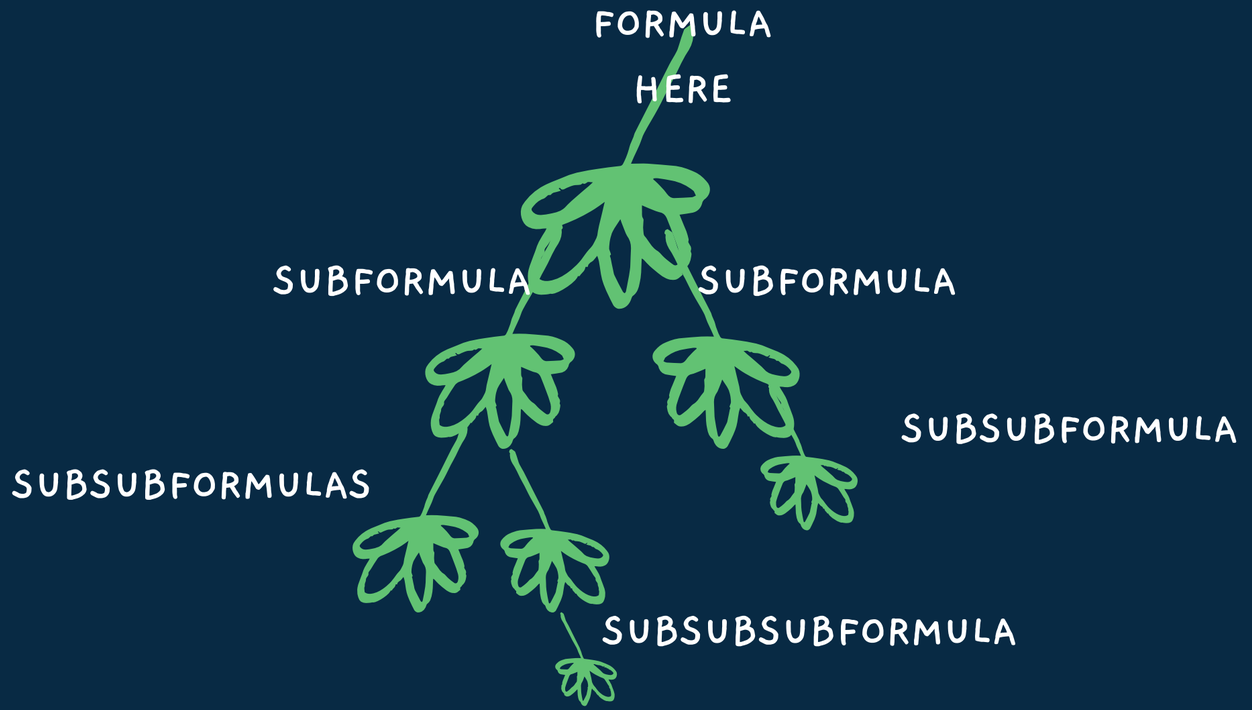
How we construct a semantic tableaux

To a formula U we can associate a semantic tableaux, which is a binary tree having formulas in its nodes and it builts following the next steps :

STEP 1 : the root of the tree is labeled with the initial formula

How we construct a semantic tableaux

STEP 2 : Every branch of the tree which contains a formula will be extended with a subtree according to the decomposition rule specific to its class

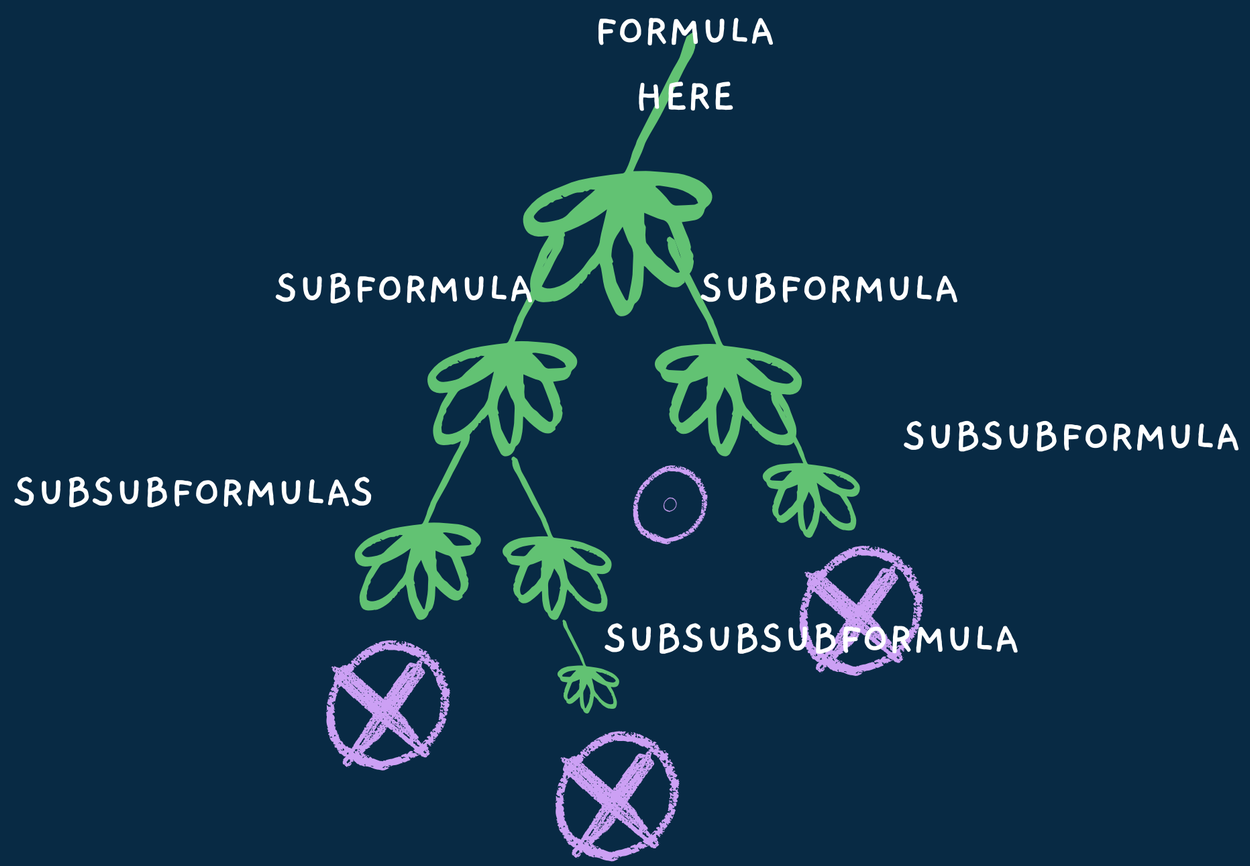


How we construct a semantic tableaux

STEP 3 : the extentions of the branches stop in the following cases :

CASE A(manda) : if that branch contains a formula and its negotiation, the branch is marked as closed

CASE B(ruh) : if all the formulas are already decomposed or if by decomposing the formulas which are not decomposed yet, no new formulas are obtained



CHAPTER 2

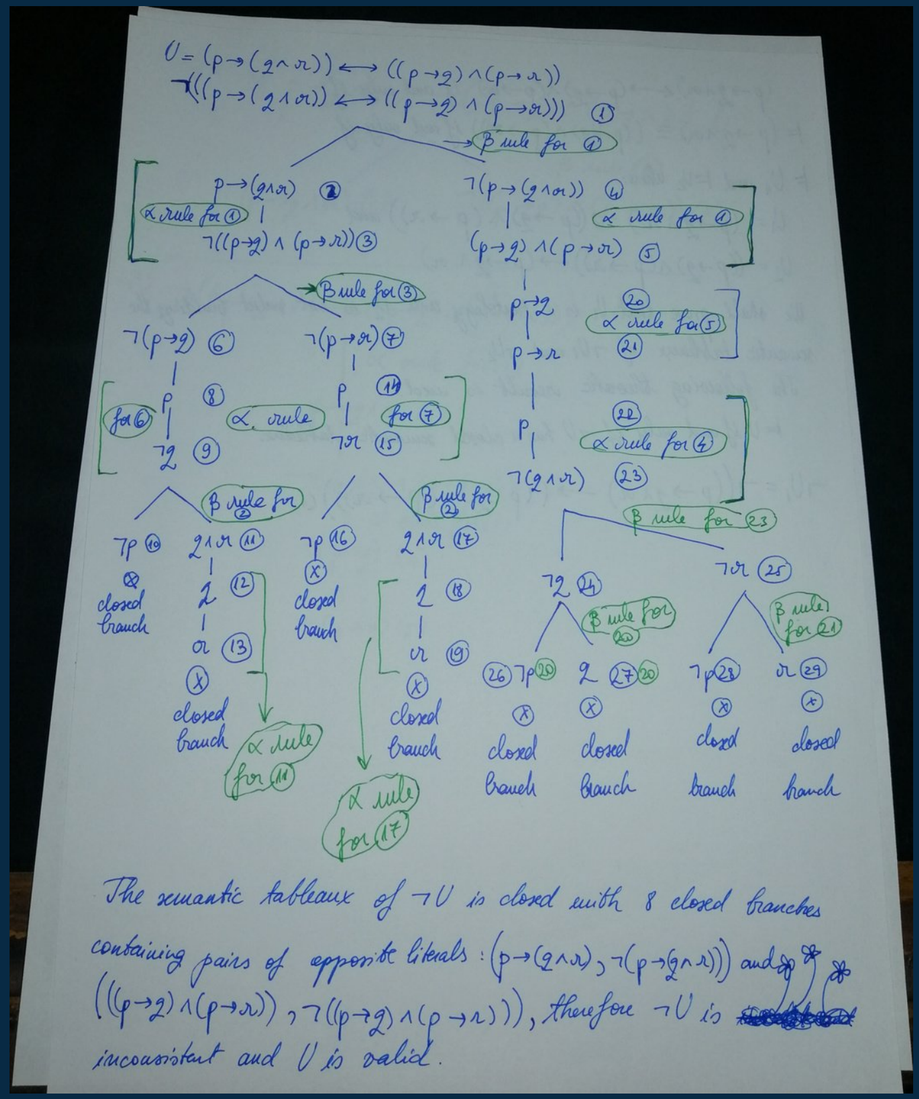
SOLUTION

EXERCISE 2

PROVE THAT THE FOLLOWING FORMULAS ARE TAUTOLOGIES USING THE SEMANTIC TABLEAUX METHOD:

1. DISTRIBUTION OF '-)' OVER ' /\' :

(P -) Q /\ R) <-) ((P-)Q) /\ (P-)R))



The semantic tableaux of $\neg U$ is closed with 8 closed branches containing pairs of opposite literals: $(p \to (q \wedge r), \neg(p \to (q \wedge r)))$ and $((p \to q) \wedge (p \to r)), \neg((p \to q) \wedge (p \to r)))$, therefore $\neg U$ is inconsistant and U is valid.

CHAPTER 3

CONCLUSION

Conclusion

The Semantic Tableaux method is a refutation proof method meaning : you have a theory X, then if the opposite of theory X is false, theory X is true,

MAY WE HAVE FUN AND PRODUCTIVE LEARNING SESSIONS.

SIGNED - BLU