Cret Valentina Andreea

exercise 6.2 – Resolution proposition

Using lock resolution prove the inconsistency of the following set of clauses. Choose two different indexings for the literals.

met 1. – first indexing

$$S_2 = \{ \underset{(2)}{q} \overset{C_1}{\vee} \underset{(1)}{\neg r},\ \underset{(3)}{\neg q} \vee \underset{(5)}{\neg p} \overset{C_2}{\vee} \underset{(4)}{\neg r},\ \underset{(7)}{\neg q} \vee \underset{(6)}{p} \overset{C_3}{\vee} \underset{(8)}{\neg r},\ \underset{(9)}{r} \overset{C_4}{} \}$$

$C_1 = {}_{(2)}q \vee {}_{(1)}\neg r$

$C_2 = {}_{(3)}\neg q \vee {}_{(5)}\neg p \vee {}_{(4)}\neg r$

$C_3 = {}_{(7)}\neg q \vee {}_{(6)}p \vee {}_{(8)}\neg r$

$C_4 = {}_{(9)}r$

$C_5 = Res^{lock}_{r}(C_1, C_4) = {}_{(2)}q$

$C_6 = Res^{lock}_{q}(C_2, C_5) = {}_{(5)}\neg p \vee {}_{(4)}\neg r$

$C_7 = Res^{lock}_{r}(C_4, C_6) = {}_{(5)}\neg p$

$C_8 = Res^{lock}_{p}(C_3, C_7) = {}_{(7)}\neg q \vee {}_{(8)}\neg r$

$C_9 = Res^{lock}_{q}(C_5, C_8) = {}_{(8)}\neg r$

$C_{10} = Res^{lock}_{r}(C_4, C_9) = \square$

met 2 – second indexing

$$S_2 = \{ \underset{(2)}{q} \overset{C_1}{\vee} \underset{(1)}{\neg r},\ \underset{(5)}{\neg q} \vee \underset{(3)}{\neg p} \overset{C_2}{\vee} \underset{(4)}{\neg r},\ \underset{(6)}{\neg q} \vee \underset{(8)}{p} \overset{C_3}{\vee} \underset{(7)}{\neg r},\ \underset{(9)}{r} \overset{C_4}{} \}$$

$C_1 = {}_{(2)}q \vee {}_{(1)}\neg r$

$C_2 = {}_{(5)}\neg q \vee {}_{(3)}\neg p \vee {}_{(4)}\neg r$

$C_3 = {}_{(6)}\neg q \vee {}_{(8)}p \vee {}_{(7)}\neg r$

$C_4 = {}_{(9)}r$

$C_5 = Res^{lock}_{r}(C_1, C_4) = {}_{(2)}q$

$C_6 = Res^{lock}_{q}(C_3, C_5) = {}_{(8)}p \vee {}_{(7)}\neg r$

$C_7 = Res^{lock}_{r}(C_4, C_6) = {}_{(8)}p$

$C_8 = Res^{lock}_{p}(C_2, C_7) = {}_{(5)}\neg q \vee {}_{(4)}\neg r$

$C_9 = Res^{lock}_{r}(C_4, C_8) = {}_{(5)}\neg q$

$C_{10} = Res^{lock}_{q}(C_5, C_9) = \square$

Conclusion:

$S_2 \vdash^{lock}_{Res} \square \Rightarrow S_2$ is inconsistent.