

14

 $\{w, y\}$

5,10 RESOLUTION

15

 $\{w\}$

4,12 RESOLUTION

16

 $\{\neg w, \neg z\}$

7,13 RESOLUTION

17

 $\{\neg w\}$

16,8 RESOLUTION

18

 \perp

15,17 RESOLUTION

WE PROVED THAT THE SET HAS CLOSED EXPANSION \Rightarrow IT IS INCONSISTENT

! WE CAN'T MAKE A RESOLUTION LIKE 7,12 :

- $\{\neg w, y\}$
 - $\{w, \neg y\}$
- $\rightarrow \{\neg y, \neg y\}$ OR $\{\neg w, w\}$. THEY ARE BOTH
SAMSFABLE BECAUSE IT IS AN AXIOM

RESOLUTION CAN BE APPLIED ONLY TO A VARIABLE AT A TIME.

USE RESOLUTION TO CHECK CONSISTENCY OF THE SET

$$S = \{ x \rightarrow y \vee z, y \rightarrow \neg x, \neg z \rightarrow x \}$$

STEP	FORMULA	RULE
1	$\{ x \rightarrow y \vee z \}$	ASSUMPTION
2	$\{ y \rightarrow \neg x \}$	ASSUMPTION
3	$\{ \neg z \rightarrow x \}$	ASSUMPTION
4	$\{ \neg x, y \vee z \}$	4, β -EXPANSION
5	$\{ \neg x, y, z \}$	4, β -EXPANSION
6	$\{ \neg y, \neg x \}$	2, β -EXPANSION
7	$\{ \neg \neg z, x \}$	3, β -EXPANSION
8	$\{ x, z \}$	7, DOUBLE EXPANSION
9	$\{ y, z \}$	5,8 RESOLUTION
10	$\{ \neg x, z \}$	9,6 RESOLUTION
11	$\{ z \}$	10,8 RESOLUTION

$\{ \neg z \}$ DO NOT APPEAR IN NONE OF THE ATOMIC FORMULAS

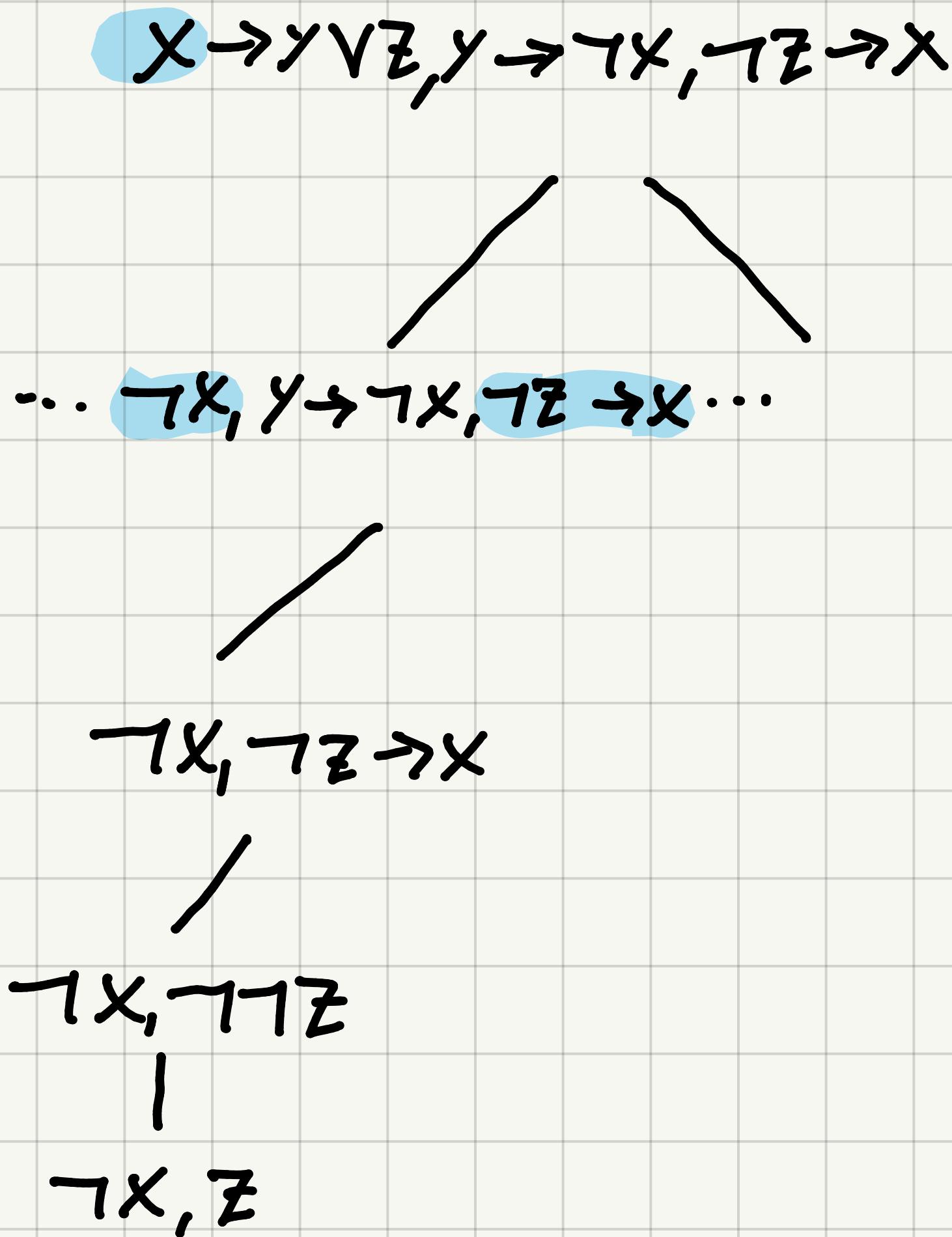
PROF: // NON SO COME PROCEDE:-)

PROOF ON CONSISTENCY IS REDUCED TO THE SET OF CLAUSES

$\{ \neg x, y, z \}, \neg y, \neg x \}, \{ x, z \}$. WE CAN CHECK ITS SATISFIABILITY

IN 2 DIFFERENT WAYS:

1] SEMANTIC TREE



$v(x)=0, v(z)=1$ IS A VALUATION OR $v \models F$ THAT SATISFIES THE SET

\Rightarrow THE SET IS CONSISTENT

2] VERIFY WHICH OF THE $3^n = 27$ CLAUSES (?)

① $\bar{X}YZ, \bar{X}\bar{Y}, X\bar{Z}$

② $\bar{X}Z, YZ, \bar{Y}Z$ NO OPPOSITE SIGNS, ALREADY DID

③ Z TO GET SOMETHING "NEW", WE SHOULD HAVE $\neg Z$

WE OBTAIN THE SATURATED RESOLVENT SET

RESFC) = { $\bar{X}YZ, \bar{X}\bar{Y}, X\bar{Z}, \bar{X}Z, YZ, \bar{Y}Z, Z$ }

RESFC) DOESN'T CONTAIN \perp , SO THE SET IS CONSISTENT