

13-1/

$$A = \{ 0^n 1 w \mid w \in \{0,1\}^* \text{ and } \lceil w \rceil \text{ as a number} = n \}$$

$$1 0 \in A \rightarrow n=0, \lceil 0 \rceil = 0$$

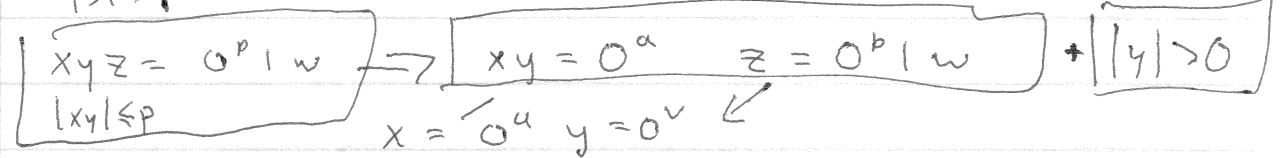
$$0 1 1 \in A \rightarrow n=1, \lceil 1 \rceil = 1$$

$$\lceil \lceil x \rceil \rceil = x$$

$$0 0 1 1 0 \in A \rightarrow n=2, \lceil 10 \rceil = 2$$

Choose $s = 0^p 1 w = 0^p 1 [P]$

$$|s| \geq p$$



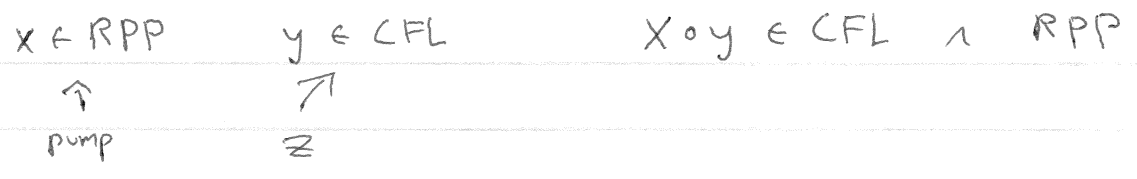
$$u + v + b = p \quad v > 0 \quad u + v \leq p$$

$$x y^i z = 0^{u + v i + b} 1 w \in A$$

$$\text{iff } u + v i + b = \lceil w \rceil$$

$i=0$ number is smaller (less bits) w is fixed

$i>1$ num is bigger (more bits)



$$x = 0^* \quad y = s \Rightarrow 0^s 1 \mid \epsilon$$

$$s' \rightarrow X Y \quad Z$$

$$X \rightarrow \epsilon \mid 0 X$$

$$Y \rightarrow 0 Y 1 \mid \epsilon$$

$$p=1 \quad s = Z \quad |s| > 1$$

0 or 01

$$x y z = \underbrace{0}_{x y} \underbrace{0 s}_{z}$$

$x y^i z$ = repeat 0s at beginning