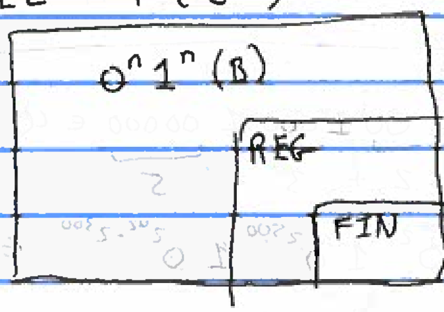
7-1

Google Hang-outs on Air

- Archive to Youtube (unlisted)
- Share screen

$ALL = P(\Sigma^*)$



regular pumping property

① $\forall A \in REG,\ RPP(A)$

$\Rightarrow \neg RPP(X) \Rightarrow X \notin REG$

② $\neg RPP(B = 0^n 1^n)$

$\Rightarrow B \notin REG$

$C_m = 0^n 1^n$ where $n \leq m$

$RPP(A) :=$	$\neg RPP(A) :=$
$\exists p \in \mathbb{N}.$	$\forall p \in \mathbb{N}.$
$\forall (w \in A \mid \lvert w \rvert \geq p)$	$\exists (w \in A \mid \lvert w \rvert \geq p).$
$\exists (x,y,z \in \Sigma^* \mid w = x \circ y \circ z$	$\forall (x,y,z \in \Sigma^* \mid w = x \circ y \circ z$
$\wedge \lvert y \rvert > 0$	$\wedge \lvert y \rvert > 0$
$\wedge \lvert xy \rvert < p)$	$\wedge \lvert xy \rvert < p),$
$\forall i \in \mathbb{N}.$	$\exists i \in \mathbb{N}.$
$x y^i z \in A.$	$x y^i z \notin A$

$\neg RPP(B = 0^n 1^n) =$

given: p choose: $0^p 1^p$

not possible
$\boxed{xy = 0^p 1 \quad z = 1^{p-1}}$
$|xy| = p+1$ $p+1 \not<$

given: x, y, z $x = 0^a$ $y = 0^b$

$a+b+c = p$ $z = 0^c 1^p$ $b > 0$

$xy^iz \in A$ iff $a+bi+c = p \Leftrightarrow a+bi+c = a+b+c$

choose: $i = 99$ $i = 1$ $\Leftrightarrow bi = b$

9-2 $B_x = 0^n 1^n x$ where $x \in \Sigma^*$

$B = B_\varepsilon$ B_{0101} $\underbrace{000}_{3}\underbrace{111}_{3}\underbrace{0101}_{x} \in B_{0101}$

$B_A = 0^n 1^n \circ a$ where $a \in A$ and $A \in REG$ (except Σ^*)

Unary addition $= \mathcal{U}$

$0^n 1 0^m 1 0^{n+m} \in \mathcal{U}$

$\underbrace{00}_{2} 1 \underbrace{000}_{3} 1 \underbrace{00000}_{5} \in \mathcal{U}$

$2 + 3 = 5$

$0^{2^{42}} 1 0^{2^{500}} 1 0^{2^{42}+2^{500}} \in \mathcal{U}$

$\neg RPP(\mathcal{U}) =$

given: p choose: $0^p 1 0^p 1 0^{2p}$

given: x, y, z $|y| > 0$ $|xy| < p$ $\Rightarrow$ $x = 0^a$ $y = 0^b$ $z = 0^c 1 0^p 1 0^{2p}$

$xy^iz \in \mathcal{U}$ iff $a + b + c = p$ $a + b < p$ $b > 0$

$a + bi + c + p = 2p$ iff

$a + bi + c = p$ iff $bi = b$ iff $i = 1$

choose: $i = 0$