



{ w | the number of 0s
in w is a multiple of 3 }

000
01100

11011100

$$p = 3$$

because the DFA
above has 3 states

x = 11
y = 011100
z = ε

|x| y |
too long

$$|x| y | \leq 3$$

$$x = 1$$

$$y = 1$$

$$z = 011100$$

$A = \{0^n 1^n \mid n \geq 0\}$ ^{show} not regular

$0^{\frac{p}{2}} 1^{\frac{p}{2}}$

$0^p 1^p$

$x = \epsilon$

$y = 0^p$

$z = \cancel{0^p} 1^p$

Consider $xyyz$

$xyyz \notin A$

more generally, y must contain 1 or more 0s
so $xyyz \notin A$ since there are
more 0s than 1s

$$B = \{ 0^i 1^j \mid i \geq j \}$$

show not regular

Candidate $0^{A+1} 1^P$

$$\begin{aligned} x &= 0 \\ y &= \cancel{0^A} 0^A \\ z &= 0^P \end{aligned}$$

$$\cancel{xyz} \notin B$$

more generally, y must contain 1 or more 0s

$$\begin{aligned} \text{so } & xy^0z \notin B \text{ since the number} \\ & \parallel \text{ of 0s is now } \leq A \\ & xz \end{aligned}$$