

Thm 5.16 P.S.P  $\Leftrightarrow$  a left parser  
 Thm 5.13 P.S.P  $\Rightarrow$  a left parser - text-bottom proof  
 Lem 5.12 proof

Lem 5.15 P.S.P  $\Leftarrow$  a left parser.  
 Lem 5.14 proof.  
 Lemma 5.12 Let  $G = (N, \Sigma, P, S)$ ,  $P = (N \cup \Sigma, \Sigma, P, \cup, S, \{\epsilon\})$

If  $\$ \gamma | x y \$ \Rightarrow_M^{\theta} \$ \delta | y \$$   $\theta \in P^*$  in  $M$   
 then  $\gamma^R \Rightarrow_{\pi}^{\theta} x \delta^R$  in  $G$ ,  $|\theta| = |\pi| + |x|$

Proof p. 11

Lemma 5.13  
 If  $\gamma = S$  and  $y = \epsilon$  in Lemma 5.12  
 If  $\$ S | x \$ \Rightarrow_M^{\theta} \$ | \$$   $\theta \in P^*$ , then  
 $S \Rightarrow_G^{\pi} x$  in  $G$   $|\theta| = |\pi| + |x|$

Lemma 5.14 Let  $G = ( )$ ,  $P = ( )$   
 If  $\gamma^R \Rightarrow_G^{\pi} x \delta^R$   $\delta = \epsilon$  or  $! : \delta \in N$ , then  
 $\$ \gamma | x y \$ \Rightarrow_G^{\theta} \$ \delta | y \$$ ,  $|\theta| = |\pi| + |x|$

Lemma 5.15  
 If  $\gamma = S$  and  $y = \epsilon$  ...

Thm 5.16  
 (1) P.S. parser is a left parser  
 (2)  $\forall w \in L(G)$ ,  $M$  produce all left parser of  $w$   
 (3)  $Time(w) = Time_G(w) + |w|$

12 12 L.P.  
 T 5.16  $\leftrightarrow$  T 5.21  
 L 5.13 L 5.18  
 L 5.12 L 5.19  
 L 5.14 L 5.19  
 L 5.15 L 5.20

lecture - top-down proof  
 $P = (N \cup \Sigma, \Sigma, P, \cup, S, \{\epsilon\})$   
 output  $\tau: P^* \rightarrow P^*$   
 $\tau(A \rightarrow w) = A \rightarrow w$   
 $\tau(a \rightarrow \epsilon) = \epsilon$   
 produce action (ques)  
 shift action (verify)

$1+2+\dots+100 = 5050$   
 $1+2+\dots+i = \frac{i(i+1)}{2}$   
 $S_{sum} = 0, i = 0$   
 do  $i \leq N \rightarrow S := S + i$   
 $i := i + 1$  od  
 $S := 1 + 2 + \dots + i$

