

<3.10> 已知文法 $G(A)$: $A \rightarrow aAB \mid a$
 $B \rightarrow Bb \mid d$

构造 LL(1) 分析表完整过程

<1> 试给出与 $G(A)$ 等价的 LL(1) 文法 $G'(A)$;

① 消除左递归: $\begin{cases} B \rightarrow dB' \\ B' \rightarrow bB' \mid \epsilon \end{cases}$

② 消除回溯: $\begin{cases} A \rightarrow aA' \\ A' \rightarrow AB \mid \epsilon \end{cases}$

改造后的文法为 $G'(A)$: $A \rightarrow aA'$
 $A' \rightarrow AB \mid \epsilon$
 $B \rightarrow dB'$
 $B' \rightarrow bB' \mid \epsilon$

First 集: $FIRST(A) = \{a\}$ Follow 集: $FOLLOW(A) = \{\#, d\}$
 $FIRST(A') = \{a, \epsilon\}$ $FOLLOW(A') = \{\#, d\}$
 $FIRST(B) = \{d\}$ $FOLLOW(B) = \{b\}$
 $FIRST(B') = \{b, \epsilon\}$ $FOLLOW(B') = \{b\}$

$A \rightarrow a \mid B$ $B \neq \epsilon \downarrow$
 $First(d) \cap First(b) = \emptyset \quad \checkmark \quad LL(1)$
 $B = \epsilon \quad First(d) \cap Follow(A) = \emptyset \quad \checkmark \quad LL(1)$

<2> 构造 $G[A']$ 的 LL(1) 分析表;

$First(A) \cap Follow(A') = \{a\} \cap \{\#, d\} = \emptyset$
 $First(b) \cap Follow(B') = \{b\} \cap \{b\} = \emptyset$ } LL(1) 文法

	a	b	l	d	#
A	$A \rightarrow aA'$				
A'	$A' \rightarrow AB$			$A' \rightarrow \epsilon$	$A' \rightarrow \epsilon$
B				$B \rightarrow dB'$	
B'		$B' \rightarrow bB'$	$B' \rightarrow \epsilon$		

<3> 给出输入串 $aad1\#$ 的分析过程

符号栈	当前输入符号	输入串
$A \rightarrow aA'$ #A	a	ad1#
#A'a	a	ad1#
$A' \rightarrow AB' \epsilon$ #A'	a	d1#
#1BA	a	d1#
#1BA'a	a	d1#
#1BA'	d	1#
$B \rightarrow dB'$ #1B	d	1#
#1B'd	d	1#
#1B'	1	#
#1	1	#
#	#	

反着压

$A \rightarrow aA'$
 $A' \rightarrow AB' | \epsilon$
 $B \rightarrow dB'$
 $B' \rightarrow bB' | \epsilon$

<3.11> 将下述文法改造为 LL(1) 文法: $G[V]: V \rightarrow N | N[E]$

$E \rightarrow V | V+E$

$N \rightarrow i$

解: $G'[V]:$
 $V \rightarrow NV'$
 $V' \rightarrow \epsilon | [E]$
 $E \rightarrow VE'$
 $E' \rightarrow \epsilon | +E$
 $N \rightarrow i$

FIRST 集: $FIRST(V) = \{i\}$
 $FIRST(V') = \{\epsilon, [\}$
 $FIRST(E) = \{i\}$
 $FIRST(E') = \{\epsilon, +\}$
 $FIRST(N) = \{i\}$

FOLLOW 集: $FOLLOW(V) = \{\#, +,]\}$
 $FOLLOW(V') = \{\#, +,]\}$
 $FOLLOW(E) = \{] \}$
 $FOLLOW(E') = \{] \}$
 $FOLLOW(N) = \{[, \#, +,]\}$

$V' \rightarrow \epsilon | [E]: FIRST(\epsilon) \cap FIRST('[') = \emptyset$, $FIRST('[') \cap FOLLOW(V') = \{[\} \cap \{\#, +\} = \emptyset$
 $E' \rightarrow \epsilon | +E: FIRST(\epsilon) \cap FIRST('+') = \emptyset$, $FIRST('+') \cap FOLLOW(E') = \{+\} \cap \{] \} = \emptyset$

即文法 $G'[V]$ 为 LL(1) 文法

$FIRST(i) \cap FOLLOW(V') = \{i\} \cap \{\#, +\} = \emptyset$
 $FIRST(+) \cap FOLLOW(E') = \{+\} \cap \{] \} = \emptyset$
 是 LL(1)