

## 第四章 SLR 语法分析

1. 考虑下面文法，构造 SLR 分析表

$$E \rightarrow E + T \mid T$$

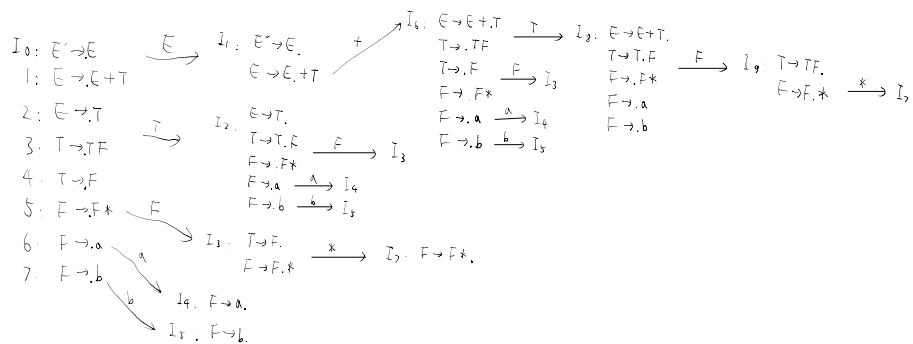
$$T \rightarrow TF \mid F$$

$$F \rightarrow F * \mid a \mid b$$

$$\text{follow}(E) = \{+, \$\}$$

$$\text{follow}(T) = \{+, \$, a, b\}$$

$$\text{follow}(F) = \{+, \$, a, b, *\}$$



| Action Table |    |    |    |    |     | Goto Table |   |   |
|--------------|----|----|----|----|-----|------------|---|---|
| state        | +  | *  | a  | b  | \$  | E          | T | F |
| 0            |    |    | s4 | s5 |     | 1          | 2 | 3 |
| 1            | s6 |    |    |    | acc |            |   |   |
| 2            | r2 |    | s4 | s5 | r2  |            |   | 3 |
| 3            | r4 | s7 | r4 | r4 | r4  |            |   |   |
| 4            |    | r6 |    |    |     |            |   |   |
| 5            |    |    |    | r7 |     |            |   |   |
| 6            |    |    | s4 | s5 |     |            | 8 | 3 |
| 7            | r5 | r5 | r5 | r5 | r5  |            |   |   |
| 8            | r1 |    | s4 | s5 | r1  |            |   | 9 |
| 9            | r3 | s7 | r3 | r3 | r3  |            |   |   |

2. 对下面文法，证明它是 LL(1) 文法，但不是 SLR 文法。

$$S \rightarrow AaAb \mid BbBa$$

$$A \rightarrow \varepsilon$$

$$B \rightarrow \varepsilon$$

$$1,2: S \rightarrow AaAb \mid BbBa$$

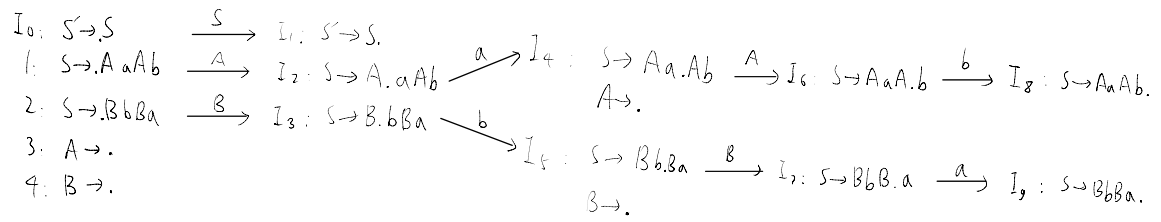
$$3: A \rightarrow \varepsilon$$

$$4: B \rightarrow \varepsilon$$

|   | first         | follow |
|---|---------------|--------|
| S | a, b          | \$     |
| A | $\varepsilon$ | a, b   |
| B | $\varepsilon$ | a, b   |

|   | a | b | \$ |
|---|---|---|----|
| S | 1 | 2 |    |
| A | 3 | 3 |    |
| B | 4 | 4 |    |

构造出的 LL(1) 解析表中每个单元格只有一条生成式，所以它是 LL(1) 文法。



| Action Table |        |        | Goto Table |  |       |
|--------------|--------|--------|------------|--|-------|
| state        | a      | b      | \$         |  | S A B |
| 0            | r3, r4 | r3, r4 |            |  | 1 2 3 |
| 1            |        |        | acc        |  |       |
| 2            | s4     |        |            |  |       |
| 3            |        | s5     |            |  |       |
| 4            | r3     | r3     |            |  | 6     |
| 5            | r4     | r4     |            |  | 7     |
| 6            |        | s8     |            |  |       |
| 7            | s9     |        |            |  |       |
| 8            |        |        | r1         |  |       |
| 9            |        |        | r2         |  |       |

而 SLR 解析表中有单元格里有两条生成式，所以它不是 SLR 文法。