消除左递归

$A \to A\alpha \mid \beta$ 化为 $\begin{cases} A \to \beta A' \\ A' \to \alpha A' \mid \varepsilon \end{cases}$

(α, β 为任意字符串)

例1: G(E) $E \to E+T \mid T$

$T \to T*F \mid F$

$F \to (E) \mid i$

⇩

$E \to TE'$

$E' \to +TE' \mid \varepsilon$

$T \to FT'$

$T' \to *FT' \mid \varepsilon$

$F \to (E) \mid i$

例2: $E \to E+T \mid E-T \mid T$

⇩

$E' \to +TE' \mid -TE' \mid \varepsilon$

$E \to TE'$

消除回溯

$A \to \delta\beta_1 \mid \delta\beta_2 \mid \cdots \mid \delta\beta_i \mid \gamma_1 \mid \gamma_2 \cdots \mid \gamma_j$

化为 $\begin{cases} A \to \delta A' \mid \gamma_1 \mid \gamma_2 \cdots \mid \gamma_j \\ A' \to \beta_1 \mid \beta_2 \mid \cdots \mid \beta_i \end{cases}$

例1:

已知文法

G(A): $A \to aAB \mid a$

$B \to Bb \mid d$

⇩

$A \to aA' \quad A' \to AB \mid \varepsilon$

$B \to dB'$

$B' \to bB' \mid \varepsilon$

例2：

G[A] ： $A \to aAB \mid a \mid b$

$$\Downarrow$$

$A \to aA' \mid b$

$A' \to AB \mid \varepsilon$