Remove ϵ productions

Elimination of ϵ productions

$A \to \epsilon$ is called as null productions.

For $L(G)$ we want to find equivalent grammar $G1$ such that

$$L(G') = L(G) - \epsilon$$

(1)

(1) $S \to ABA$

$A \to aA \mid \epsilon$

$B \to bB \mid \epsilon$

(1) identify Null productions.

$A \to \epsilon$

$B \to \epsilon$

(2) Identify nullable symbols.

(S, A, B) are nullable symbols

(3) Add new productions for nullable symbols.

Rewrite

$S \to ABA \mid BA \mid AA \mid AB \mid A \mid B \mid$

$A \to aA \mid a$

$B \to bB \mid b$

(2) $S \to AB \mid \epsilon$

(2) $A \to aASb \mid a$

$B \to bS$

$S \to \epsilon$

A & B are nullable

$S \to AB$

$A \to aASb \mid a \mid aAb$

$B \to bS \mid b$