Transformation Algorithms

Reference Sudkamp, Chapter 4

Algorithm 4.2.1
Construction of the NULL Set

input
Context Free Grammar $G = (V, \Sigma, P, S)$
1.$NULL = \{A \mid A \rightarrow \lambda \in P\}$
2.**repeat**
2.1 PREV = NULL;
2.2 **for** each variable $A \in V$ **do**
if there is a rule $A \rightarrow w$ and $w \in PREV^*$
$NULL = NULL \cup \{A\}$
until $NULL == PREV$

Algorithm 4.3.1
Construction of the Set CHAIN(A)

input
Context Free Grammar $G = (V, \Sigma, P, S)$
1.$CHAIN(A) = \{A\}$
2.$PREV = \phi$
3.**repeat**
3.1 $NEW = CHAIN(A) - PREV$;
3.2 $PREV = CHAIN(A)$
3.3 **for** each variable $B \in NEW$ **do**
for each rule $B \rightarrow C$ **do**
$CHAIN(A) = CHAIN(A) \cup \{C\}$
until $CHAIN(A) == PREV$

Algorithm 4.4.2
Construction of the Set of variables that derive Terminal Strings

input
Context Free Grammar $G = (V, \Sigma, P, S)$
1.$TERM = \{A \mid A \rightarrow w \in P\}$ with $w \in \Sigma^*$
2.**repeat**
2.1 $PREV = TERM$;
2.2 **for** each variable $A \in V$ **do**
if there is a rule $A \rightarrow w$,
$w \in \{PREV \cup \Sigma\}^*$ **then**
$TERM = TERM \cup \{A\}$
until $PREV == TERM$

Algorithm 4.4.4
Construction of the Set of Reachable Variables

input
Context Free Grammar $G = (V, \Sigma, P, S)$

1. $REACH = \{S\}$
2. $PREV = \phi$
3. **repeat**
   - 3.1 $NEW = REACH - PREV$;
   - 3.2 $PREV = REACH$
   - 3.3 **for** each variable $A \in NEW$ **do**
     - **for** each rule $A \rightarrow w$ **do**
       - add all variables in w to REACH

until $REACH == PREV$