laboratorio 7

1) $S \to 0A0 \mid 1B1 \mid BB$

$A \to C$

$B \to S \mid A$

$C \to S \mid \varepsilon$

a) $C \to \varepsilon \Rightarrow C$ ∴ anulable

$A \to C$ ∴ anulable

$B \to A$ ∴ anulable

$S \to BB$ ∴ anulable

sin ε:

$S \to 0A0 \mid 00 \mid 1B1 \mid 11 \mid BB \mid B \mid \varepsilon$

$A \to C \mid \varepsilon$

$B \to S \mid A \mid \varepsilon$

$C \to S \mid \varepsilon$

⟹

$S \to 0A0 \mid 00 \mid 1B1 \mid BB \mid B$

$A \to C$

$B \to S \mid A$

$C \to S$

b) $S \to 0A0 \mid 00 \mid 1B1 \mid 11 \mid BB \mid B$

$A \to S$

$B \to S$

$C \to S$

c) No hay símbolos inútiles

d) $X_0 \to 0$

$X_1 \to 1$

$S \to X_0 A X_0 \mid Y_0 X_0 \mid X_1 B X_1 \mid X_1 X_1 \mid BB \mid B$

$A \to S$

$B \to S$

$C \to S$

$S \to X_0 Y_1 \mid X_0 X_0 \mid X_1 Y_2 \mid X_1 X_1 \mid BB \mid B$

$Y_1 \to A X_0$

$Y_2 \to B X_1$

$A \to S$

$B \to S$

$C \to S$

$X_0 \to 0$

$X_1 \to 1$

2) $S \to aAa \mid bBb \mid \varepsilon$

$A \to C \mid a$

$B \to C \mid b$

$C \to CDE \mid \varepsilon$

$D \to A \mid B \mid ab$

a) $S \to \varepsilon$ ∴ anulable

$C \to \varepsilon$ ∴ anulable

$A \to C \Rightarrow A$ ∴ anulable

$B \to C \Rightarrow B$ ∴ anulable

$D \to A \mid B \Rightarrow D$ ∴ anulable

Anulables: $\{S, C, A, B, D\}$

sin ε:

$S \to aAa \mid aa \mid bBb \mid bb$

$A \to C \mid a$

$B \to C \mid b$

$C \to CDE \mid CE \mid CD \mid D \mid E$

$D \to A \mid B \mid ab$

b) $S \to aAa \mid aa \mid bBb \mid bb$

$A \to CDE \mid CE \mid CD \mid D \mid E \mid a$

$B \to CDE \mid CE \mid CD \mid D \mid E \mid b$

$C \to CDE \mid CE \mid CD \mid D \mid E$

$D \to CDE \mid CE \mid CD \mid D \mid E \mid a \mid b \mid ab$

c) E ∴ no fue definido en la gramática

$S \to aAa \mid aa \mid bBb \mid bb$

$A \to CDE \mid CD \mid D \mid a$

$B \to CDE \mid CD \mid D \mid b$

$C \to CDE \mid CD \mid D$

$D \to CD \mid CDE \mid a \mid b \mid ab$

d) $X_a \to a$

$X_b \to b$

$S \to X_a Y_1 \mid X_a X_a \mid X_b Y_2 \mid X_b X_b$

$Y_1 \to A X_a$

$Y_2 \to B X_b$

$A \to CDE \mid CD \mid D \mid X_a$

$B \to CDE \mid CD \mid D \mid X_b$

$C \to CDE \mid CD \mid D$

$D \to CD \mid CDE \mid X_a \mid X_b \mid X_a X_b$

$X_a \to a$

$X_b \to b$

3) $S \to ASA \mid aB$

$A \to B \mid S$

$B \to b \mid \varepsilon$

a) $B \to \varepsilon$ ∴ anulable

$A \to B \Rightarrow A$ ∴ anulable

$S \to ASA$ ∴ anulable

anulables = $\{B, A, S\}$

Sin ε:

$S \to ASA \mid SA \mid AS \mid S \mid aB \mid a$

$A \to B \mid S$

$B \to b$

b) $S \to ASA \mid SA \mid AS \mid S \mid aB \mid a$

$A \to ASA \mid SA \mid AS \mid S \mid aB \mid a \mid b$

$B \to b$

c) No hay símbolos inútiles.

d) $X_a \to a$

$X_b \to b$

$S \to AY_1 \mid SA \mid AS \mid X_a B \mid X_a$

$Y_1 \to SA$

$A \to AY_2 \mid SA \mid AS \mid X_a B \mid X_a \mid X_b$

$Y_2 \to SA$

$B \to X_b$

$X_a \to a$

$X \to b$