

# LFTC - SEMINAR 9

## Analizator descendent cu reveniri

$(S, i, [ , ])$  <sup>psa. curentă</sup>

S - stare

q - st. normală

r - st. revenire

t - st. terminare

e - st. eroare

$(q, i, \alpha, [A] \beta) \xrightarrow[\text{ext.}]{\text{expandare}} (q, i, \alpha, A_1, \gamma, \beta)$

$A_1 \rightarrow \gamma$  producție

$(q, i, \alpha, [a_j] \beta) \xrightarrow[a_j = a_i]{\text{avans}} (q, i+1, \alpha a_j, \beta)$

$(q, i, \alpha, a_j \beta) \xrightarrow[a_j \neq a_i]{\text{insucces de moment}} (r, i, \alpha, a_j \beta)$

$(q, m+1, \alpha, \epsilon) \xrightarrow{\text{succes}} (t, m+1, \alpha, \epsilon)$

$(r, i, \alpha a, \beta) \xrightarrow{\text{revenire}} (r, i-1, \alpha, a \beta)$

$(r, i, \alpha A_i, \gamma, \beta) \xrightarrow[\gamma A_{i+1} \rightarrow \gamma_{i+1}]{\text{altă încercare}} (r, i, \alpha A_{i+1}, \gamma_{i+1}, \beta)$

$\xrightarrow{i=1, A_1=S} (e, 1, \epsilon, S)$

$\xrightarrow{\nexists A_{i+1}} (r, 1, \alpha, A \beta)$

! Nu funcționează dacă gramatica e recurentă la stânga! (backtracking)

1. Fie gramatica:

$S \rightarrow aSbS$

$S \rightarrow aS$

$S \rightarrow \epsilon$

Folosind analizatorul descendent cu reveniri verificați dacă:

a)  $acbc \in L(G)$

b)  $cb \in L(G)$

$$a) (q, 1, \epsilon, S) \xrightarrow{\text{expandare}} (q, 1, S_1, aSbS) \xrightarrow{\text{avans}} (q, 2, S_1, a, SbS)$$

$$\xrightarrow{\text{expandare}} (q, 2, S_1aS_1, aSbSbS) \xrightarrow[\text{moment}]{\text{insucces de}} (r, 2, S_1, aS_1, aSbSbS)$$

$$\xrightarrow[\text{(I)}]{\text{alta incercare}} (q, 2, S_1aS_2, aSbS) \xrightarrow[\text{moment}]{\text{insucces de}} (r, 2, S_1, aS_2, aSbS)$$

$$\xrightarrow[\text{(I)}]{\text{alta incercare}} (q, 2, S_1aS_3, cbS) \xrightarrow{\text{avans}} (q, 3, S_1aS_3c, bS) \xrightarrow{\text{avans}} (q, 4, S_1aS_3cb, S)$$

$$\xrightarrow{\text{expandare}} (q, 4, S_1aS_3cbS_1, aSbS) \xrightarrow[\text{moment}]{\text{insucces de}} (r, 4, S_1aS_3cbS_1, aSbS)$$

$$\xrightarrow[\text{(I)}]{\text{alta incercare}} (q, 4, S_1aS_3cbS_2, aS) \xrightarrow[\text{moment}]{\text{insucces de}} (r, 4, S_1aS_3cbS_2, aS)$$

$$\xrightarrow[\text{(I)}]{\text{alta incercare}} (q, 4, S_1aS_3cbS_3, c) \xrightarrow{\text{avans}} (q, 5, S_1aS_3cbS_3c, \epsilon)$$

$$\xrightarrow{\text{succes}} (t, 5, S_1aS_3cbS_3c, \epsilon) \Rightarrow acbc \in L(G) \text{ si } S_1, S_3, S_3 \text{ giro de prod. corespunzator}$$

$$b) (q, 1, \epsilon, S) \xrightarrow{\text{expandare}} (q, 1, S_1, aSbS) \xrightarrow[\text{moment}]{\text{insucces de}} (r, 1, S_1, aSbS)$$

$$\xrightarrow{\text{alta incercare}} (q, 1, S_2, aS) \xrightarrow[\text{moment}]{\text{insucces de}} (r, 1, S_2, aS) \xrightarrow{\text{alta incercare}} (q, 1, S_3, c)$$

$$\xrightarrow{\text{avans}} (q, 1, S_3c, \epsilon) \xrightarrow[\text{moment}]{\text{insucces de}} (r, 2, S_3c, \epsilon) \xrightarrow{\text{revenire}} (r, 1, S_3, c)$$

$$\xrightarrow[\text{(h)}]{\text{alta incercare}} (e, 1, \epsilon, S)$$



2 Analiz pentru gramatica:

$$S \rightarrow +SS$$

$$S \rightarrow -SS$$

$$S \rightarrow a$$

și succedă +a-aa.

$$(q, 1, \epsilon, S) \xrightarrow{\text{expandare}} (q, 1, S_1, +SS) \xrightarrow{\text{avans}} (q, 2, S_1, +SS) \xrightarrow{\text{expandare}} (q, 2, S_1 + S_1, +SSS)$$

$$\xrightarrow[\text{moment}]{\text{insucces de}} (\pi, 2, S_1 + S_1, +SSS) \xrightarrow[(1)]{\text{a.i.}} (q, 2, S_1 + S_2, -SSS) \xrightarrow[\text{de mom.}]{\text{insucces de}} (\pi, 2, S_1 + S_2, -SSS)$$

$$\xrightarrow[(1)]{\text{a.i.}} (q, 2, S_1 + S_3, aS) \xrightarrow{\text{avans}} (q, 3, S_1 + S_3, a, S) \xrightarrow{\text{expandare}} (q, 3, S_1 + S_3 + S_1, +SS)$$

$$\xrightarrow[\text{de mom}]{\text{insucc.}} (\pi, 3, S_1 + S_3 + S_1, +SS) \xrightarrow[(1)]{\text{a.i.}} (q, 3, S_1 + S_3 + S_2, -SS) \xrightarrow{\text{avans}} (q, 4, S_1 + S_3 + S_2, -SS)$$

$$\xrightarrow{\text{expandare}} (q, 4, S_1 + S_3 + S_2 - S_1, +SSS) \xrightarrow[\text{de mom}]{\text{insucc.}} (\pi, 4, S_1 + S_3 + S_2 - S_1, +SSS)$$

$$\xrightarrow[(1)]{\text{a.i.}} (q, \pi, S_1 + S_3 + S_2 - S_2, -SSS) \xrightarrow[\text{de mom.}]{\text{insucc.}} (\pi, 4, S_1 + S_3 + S_2 - S_2, -SSS)$$

$$\xrightarrow[(1)]{\text{a.i.}} (q, 4, S_1 + S_3 + S_2 - S_3, aS) \xrightarrow{\text{avans}} (q, 5, S_1 + S_3 + S_2 - S_3, a, S) \xrightarrow{\text{expandare}} (q, 5, S_1 + S_3 + S_2 - S_3 + S_1, +SSS)$$

$$\xrightarrow[\text{mom}]{\text{insucc de}} (\pi, 5, S_1 + S_3 + S_2 - S_3 + S_1, +SSS) \xrightarrow[(1)]{\text{a.i.}} (q, 5, S_1 + S_3 + S_2 - S_3 + S_2, -SS)$$

$$\xrightarrow[\text{mom}]{\text{insucc de}} (\pi, 5, S_1 + S_3 + S_2 - S_3 + S_2, -SS) \xrightarrow[(1)]{\text{a.i.}} (q, 5, S_1 + S_3 + S_2 - S_3 + S_3, a)$$

$$\xrightarrow{\text{avans}} (q, 6, S_1 + S_3 + S_2 - S_3 + S_3, a, \epsilon) \xrightarrow{\text{succes}} (\epsilon, 6, S_1 + S_3 + S_2 - S_3 + S_3, a, \epsilon)$$

$\Rightarrow +a-aa \in L(G)$  și șirul produselor utilizate este:  $S_1, S_3, S_2, S_3, S_3$