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ed a symperou sidelling programable

5-x ablance

P: 5 = > a / aa / or B / aa P

11 99 - 8

formed textroops lecture notes and coorded to

18, Aj .= N

FOC Home Work. 2.-2023.

ploted done

Problem 1 . problem 10, Sec 4.3 from Linz.

Proof :-

Proof by contradiction

Assume L= {w & da, b, c}* . (w) = 3 na(w)} regular.

By Pumping Lemma, there is some integer in with the Property given by PL.

forement indicate mesal

(1 2 1 4 4 1 2 1) = D

consider w = and & well, |w| >m.

so we can be split as xyz where (1) [xy] < m

(8) (4/20

where xyiz EL.

from (1) $xy = \delta$ for some $s \le m \ \ell$ let $y = a^{\frac{1}{2}}$ for some $0 \le t \le s$.

But then by PL | x y 2 EL.

since to my the am and the mettern since to metter am and the mettern sut clearly and by the L. This is contradiction but clearly and by the L. This is contradiction in Lieduce days, 19th; [w] = 3na(w)) is not regular.

Problem 2: 9(d), sec 501 from linz hoppen is exaptent to 5 sol given L= {abm : an = m < 3n} G= ((5), (a, b), 5, P). where production P are. 5-> asbb asbb 1 5 E { 5 } & (a, 5, b) & (VUT)* (i) abb EL , (ii) abbb EL. 2) small common prigging 18 Problem 3: 12(d), sec 5.1 from ling. sol given L= danbmck: K=In-mlg we have two cases (1) n 7m (11) n 1m. case(i): n>m K=n-m. Where Ly 3 CL K+m=n. -(1) Substitute (1) in L => L = atam bmck. :. context free grammar G = ((5,5,1), (a,b,c), 5, P) Productions => 5, -> asc |s2/1 Sa -> asab A. case(:) m > n K = m - nsubstitute (2) in $L \Rightarrow L = abbck$ K+n=m. -(2) Productions => 53 -> 5954

Sy -> 654C/1

so, the union of 2 cases is

 $5 \rightarrow 5_1/5_3$ 10995, -> asic|sa|1 on asic|sa|1 down to a sab / more salmond to radmin at A B A es 53 -> 52 Su de donne de la propertie de la serie de la laval Su -> bSuc / 2.

Problem 4! Problem 29, sec 5.1 from Linz.

Sol It is given that productions are of the form:

A -> U such that |v| = K > 1.

This shows there cannot be any of productions.

If we draw derivation tree for any w E1(G) we get a

K-ary tree 1.e every node has 3 children or no children.

The height of the K-ary tree is minimum if all the leap nodes are on the same level.

50, if a derivation tree contains h levels & each node gives

K children then Iwl = Kxxx ---- h times.

$$h = \log_h^{|w|} - 0$$

fout a proces 10

The height of the K-ary tree is maximum it one of its branch extends rontinuously.

So let us consider the length of the word is lal height is h & k is number of branches from each node at each level if we extend just one branch then we get k-1 alphabets.

so for h levels, we get h(K-1) alphabets

In the last level, further we don't extend the node.

so we get an extra alphabet.

: total # of alphabets = (k-1) h +1, but the total

worldien then they a kake ---- partition w

of words = [w]

1 = 1 = h. 2 - (2) pro-x sort go tolera sort

from (1) & (2) $\log |w| \le h \le \frac{|w|-1}{k-1}$

Problem 5: 9, Sec 601 from Ling.

Given production rules P: 5-> AaBlaaB

A -> 1

B-> bbA/A

stepl: Identifying nullable variables.

Vo = {A,B}

V, = {A,B}

Step2: Dropping all 1 productions.

(1) dropping A-31

Po, 5-> aBlaaB

B -> 664 /4 Wrold smold DOF

(2) dropping Bad

P: 5 -> a laa laBlaaB

B-> bb. 11.

Note: Referred Textbook, Lecture notes and worked with vamshi Reddy.