

Math 322

(ch 3)

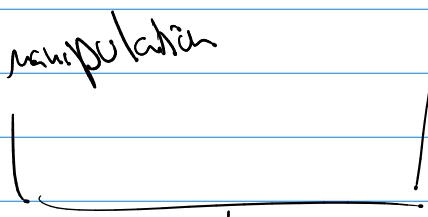
Language / Grammar

("algebra")

[symbol manipulation]

State Machines

(Graph theory)



Finite State Automations (Turing Machine)

(S1)

Phrase-Structure Grammars

Def S₀V is a vocabulary or alphabet is a non-empty set of symbols.

Ex V = {a, b, A, B, S, 0, 1, c}

② V* the set of all possible concatenations of symbols of V.

③ a sentence or word is a finite length string of symbols

④ Z is the sentence or word of no length (null string or empty string)

⑤ Language is a subset of V*.

Symbols: Terminals (symbols that are not meant to be replaced)
Non-Terminals (symbols that are to be replaced)

ex: article \rightarrow a
article \rightarrow the

Start Symbol: a Non-terminal that starts the process & replacement

ex sentence \rightarrow noun ph, verb ph

Productions: rules of replacement

$$\square \rightarrow \Delta$$

G is a phrase-structure grammar.

$$G = (V, T, S, P)$$

V : Vocabulary $\rightarrow V = T \cup N$

T : set of terminals

S : start symbol

P : set of productions

P set of $(z_0 \rightarrow z_1)$

use it?

$l z_0 r \xrightarrow{P} l z_1 r$ direct derivation.

Ex $P_1 : aA \rightarrow aab$, $P_2 : bBb \rightarrow abb$

$aAaAbBb \xrightarrow{P_1} aAaabBb \xrightarrow{P_2} aababb \xrightarrow{P_2} aabacabb$

Ter) $aAaABb \xrightarrow{*} aabaaabb$ derivable

$$L(G) = \{ w \in T^* \mid S \xrightarrow{*} w \}$$

language of a Grammar.

the languages $L(G)$ are dependent on the products
 $w_1 \rightarrow w_2$ visit $l w_1 r \Rightarrow l w_2 r$

<u>Name:</u>	<u>Type</u>	<u>restriction on P</u>
phrase-structure grammar	0	none
context-sensitive (noncontracting)	1	$S \rightarrow R$ is ok $lAr \rightarrow l\textcircled{w}r$ and $w \in T$ \textcircled{w} non-term
context-free	2	$A \rightarrow$ \nwarrow single non-term

regular	3	$A \rightarrow aB$ term, non-term $A \rightarrow a$ term
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