TÖL301G

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Pumping Lemma for CFL

Theorem 31 (Thm. 2.34: Pumping lemma for CFL)

*If A is a context-free language, then there is a number p (the pumping length)
where, if s is any string in A of length at least p, then s may be divided into five
pieces, $s = uvxyz$, satisfying the conditions*

1. $uv^i xy^i z \in A$ *for each* $i \geq 0$
2. $|vy| > 0$
3. $|vxy| \leq p$.

Note:

▲ Condition 1: you can pump "up" and "down"

▲ Condition 2: both v and y cannot be empty strings

▲ Condition 3: the length of substrings vxy is at most p

Proof: see the book.