Recursivity in phonology – what can it mean below the word?

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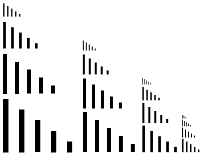
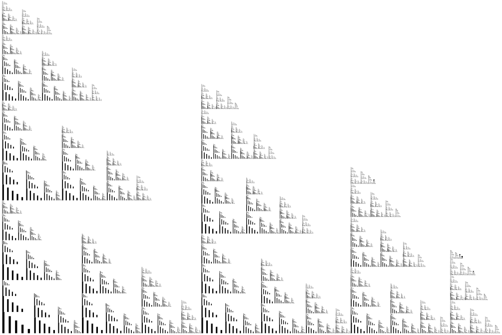


Recursion



Recursion

The Hitchhiker's Guide to

DON'T
PANIC

Recursion

Brief History

Recursive procedures *sensu lato*

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Recursive procedures *sensu stricto*

- are themselves recursive definitions
- have a rich theory even confined to procedures on integers
- and became a key part of programming from the 50s

Recursive definitions

(Modernized) Peano's definition of natural numbers:

- 0 is a natural number
- if n is a natural number, so is $\mathsf{S}(n)$
- (nothing else is a natural number)

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Binary trees:

$$\text{Tree} \rightarrow \text{Leaf} \mid \text{Tree Tree}$$

$$\text{Tree} := \text{leaf} \mid \text{node}(\text{Tree}, \text{Tree})$$

$$\text{Tree} = \{\emptyset\} \cup (\text{Tree} \times \text{Tree})$$

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More syntax:

$$\text{NP} \to \text{N} \mid \text{Adj NP} \mid \text{NP PP}$$

$$\text{PP} \to \text{P NP}$$

Recursion and Iteration

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Recursive definitions and computations can be *implemented* using iteration, arithmetic or pointers, and **unbounded** memory.

Iterative definitions basically give regular expressions – much less than recursion. (Cf. Jeff Heinz *et al.* on subregular phonology.)

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No (potential) infinity = no recursion!
Bounded recursion is not real recursion!

Recursion in language

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Language games are outwith the bounds of natural language.

Bounds on recursion

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Jim Hurford (2012) and students say maybe four is comprehensible:

Entweder
die Sprache,
die Kinder
von ihren,
sich an den Haaren zerrenden
Eltern
lernen,
ist Deutsch,
oder sie sind dumm.

Unbounded right embedding = iteration

This is the farmer sowing the corn,
That kept the cock that crowed in the morn.
That waked the priest all shaven and shorn,
That married the man all tattered and torn,
That kissed the maiden all forlorn,
That milked the cow with the crumpled horn,
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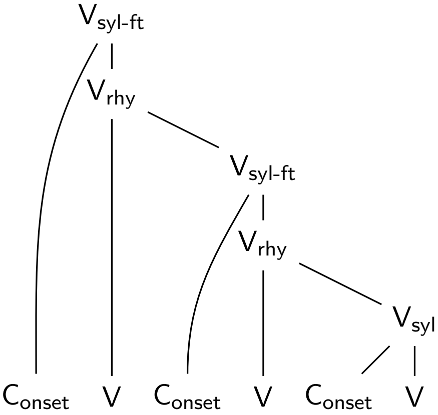
Unbounded left/centre-embedding in supra-word phonology???

Infra-word potential recursion: prosody

For example, van der Hulst (2010) claims:



for the English dactyl (*seren**dipity***).

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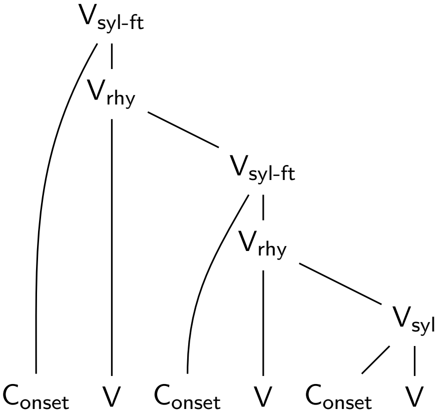

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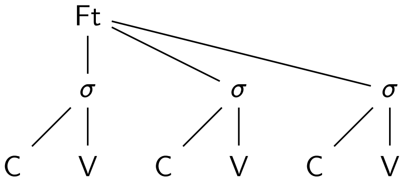
Level 5 recursion in feet when we can't even do that in syntax?

Infra-word ~~potential recursion:~~ prosody

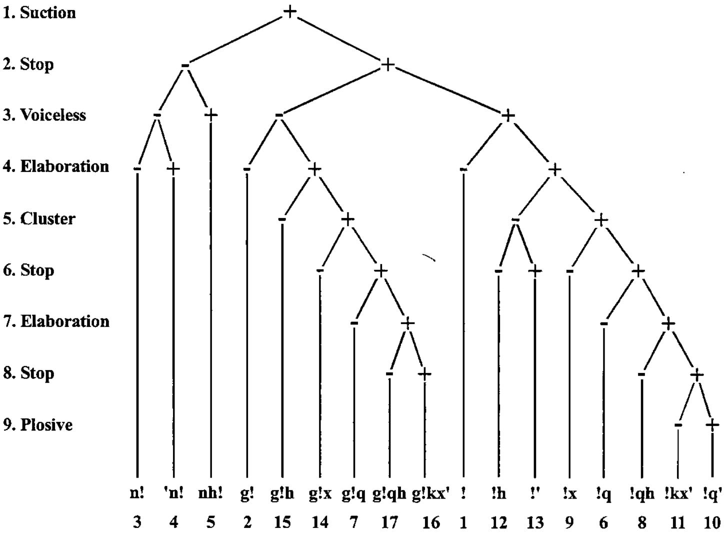


Feet longer than dactyls are also iterative in most theories (perhaps excepting grid–mark phonology) and tend to be supra-word.

(Is ‘characterlessness’ really one foot?)

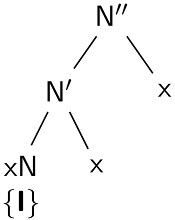
Feature geometry and friends

Tom Güldemann's feature geometry of clicks:



Element geometry and friends

Markus will (almost certainly:) show us things like



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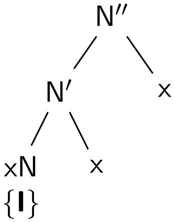

If you buy the idea that sounds are represented and distinguished by configurations of trees of sets of elements, this might be recursion . . . but how far? Level three? So not recursion.

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