



Functional Generative Description (FGD)

System of layers; lower layers

Markéta Lopatková

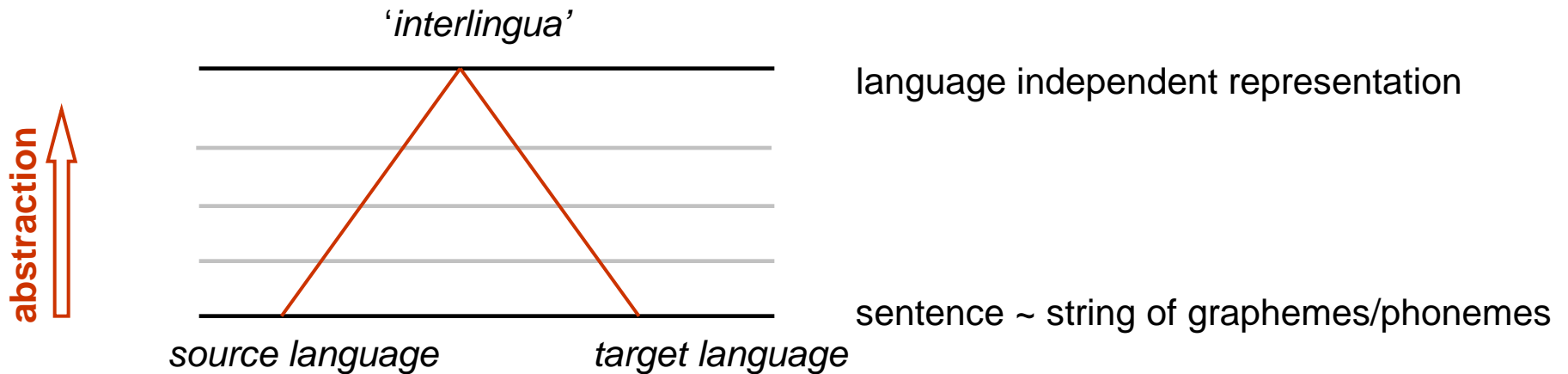
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Basic characteristics of FGD



- motivation: machine translation

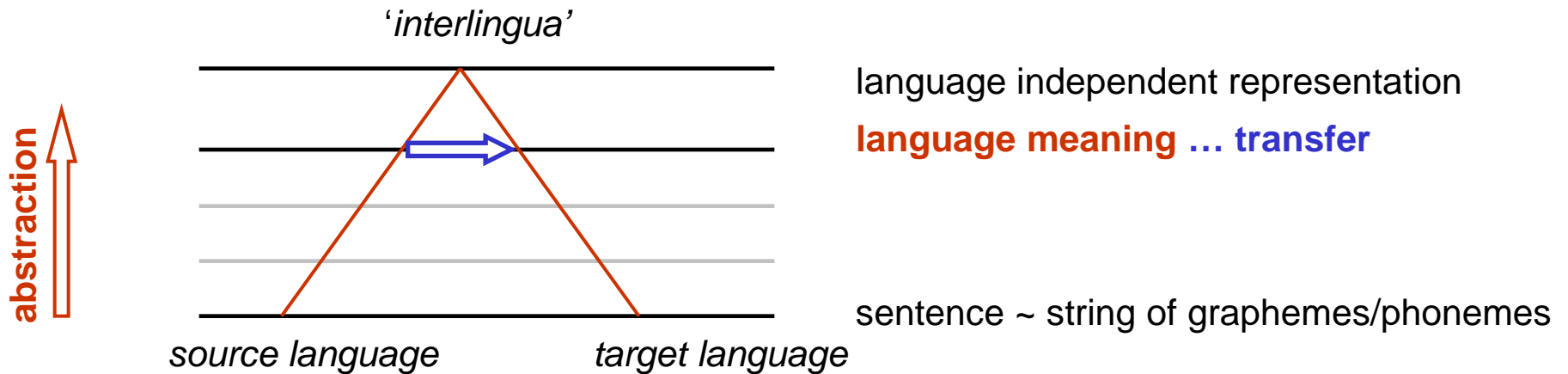


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- since 1970s ... together with Eva Hajičová, Jarmila Panevová
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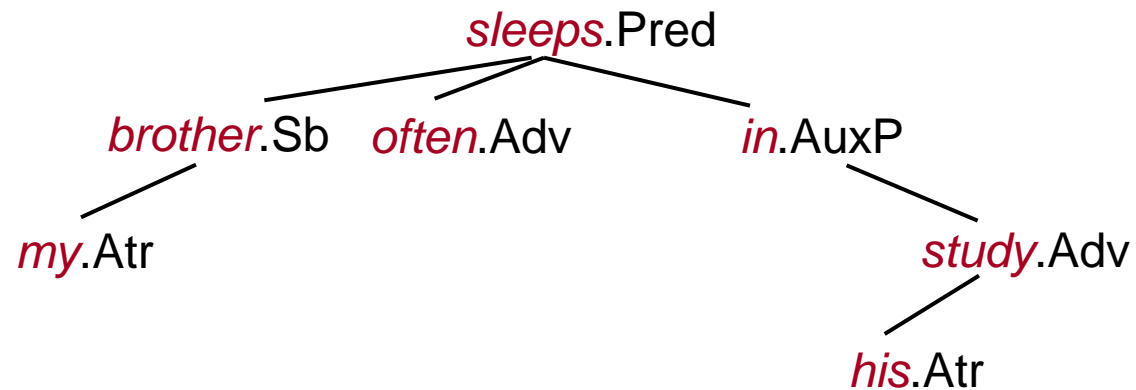
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Basic characteristics of FGD (cont.)



'classical' version of FGD:

- dependency framework
 - formal description
 - suitable mathematical formalism

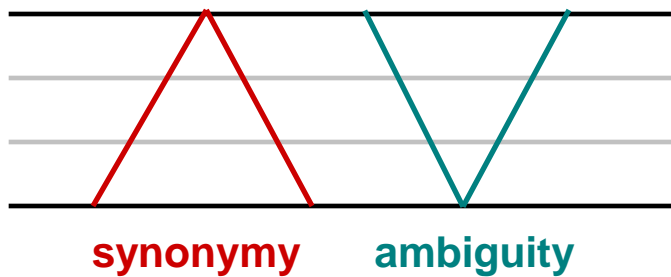


Basic characteristics of FGD (cont.)



'classical' version of FGD:

- dependency framework
- stratificational approach



language meaning ~ **function**

string of graphemes/phonemes ~ **form**

Basic characteristics of FGD (cont.)



'classical' version of FGD:

- dependency framework
- stratificational approach
- relation between a form and its function
/ a function and its form



functional

Basic characteristics of FGD (cont.)



'classical' version of FGD:

- dependency framework
- stratificational approach
- relation between a form and its function
/ a function and its form
- language meaning (not cognitive content)
- *generative* vs. analytical



functional

Basic characteristics of FGD (cont.)



- tradition of Prague Linguistic Circle
 - structural school, since 1926
 - Mathesius, Trnka, Havránek, Mukařovský, Jakobson, Trubeckoj, Karcevskij, ...
- language as a system ~ langue
vs. individual utterances ~ parole
- stress on testable criteria for distinguishing lang. phenomena

Basic characteristics of FGD (cont.)



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- language as a system ~ langue
vs. individual utterances ~ parole
- stress on testable criteria for distinguishing lang. phenomena
- higher layers of language description (syntax)
- topic focus articulation as a part of language meaning

Two components of FGD



- generative component
 - ~ to define all formally correct meaning representations (of possible sentences of a given language)
 - formalism: 1) phrase rules, phrase structure trees + functors
2) dependency trees
 - push-down automaton

Two components of FGD



- generative component
 - ~ to define all formally correct meaning representations (of possible sentences of a given language)
 - formalism: 1) phrase rules, phrase structure trees + functors
2) dependency trees
 - push-down automaton
- translation component
 - ~ translating meaning representations to lower layers
 - sequence of push-down transducers plus finite-state automaton

Main pillars of FGD



- system of layers
- valency theory
- topic focus articulation
- anaphora / coreference

System of layers in FGD



meaning

deep / underlying syntax
tectogrammar

surface syntax

morphematics

morphonology

expression

phonology/phonetics

System of layers in FGD (cont.)



sentence ... full representation on each layer of description

each layer ~ set of descriptions for all possible sentences

- finite set of elementary units
- finite set of operations and relations → set of complex units
- finite set of relations between sentence representations on a particular layer and its representations on adjacent layers

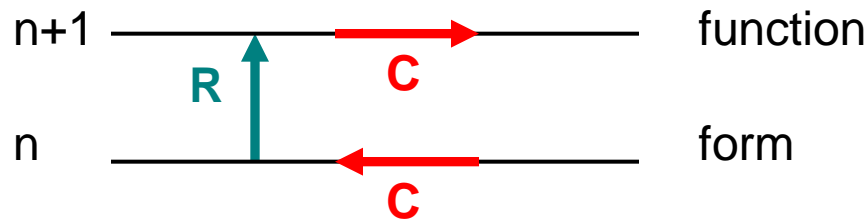
System of layers in FGD (cont.)



sentence ... full representation on each layer of description

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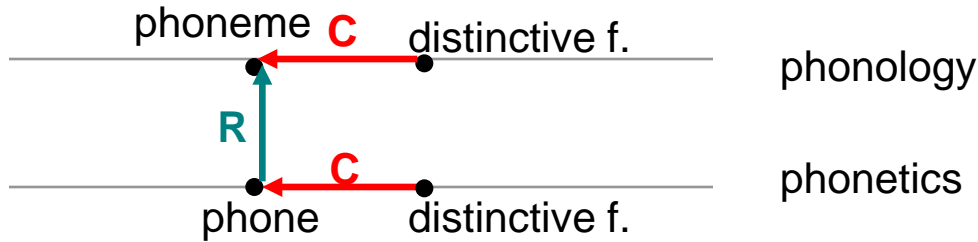
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type C relations (composition): elementary units constitute complex units
i.e., relations between units of the same layer

type R relations (representation): form-function relation
i.e., relation between adjacent layers

System of layers in FGD (cont.)



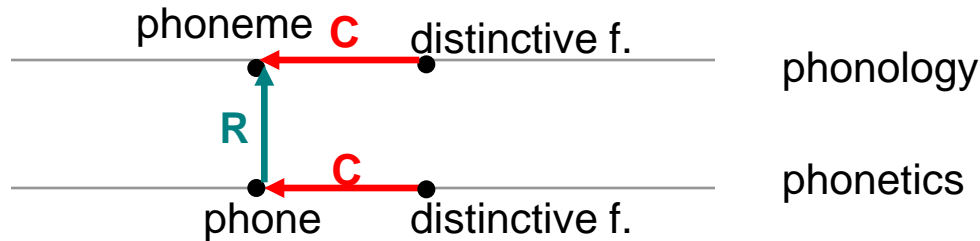
layer of phonetics

distinctive features ... elementary units

phones (~ a speech sound) ... complex units

suprasegmental units ... prosody, intonation

System of layers in FGD (cont.)



layer of phonetics

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layer of phonology

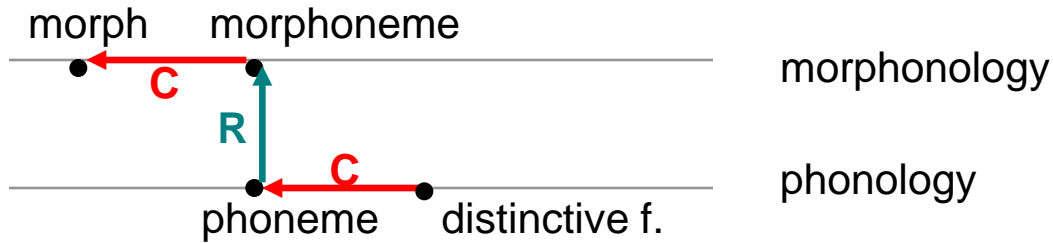
distinctive features ... elementary units

phonemes (~ 'smallest' units that distinguish meaning) ... complex units

asymmetry ... allophones ~ variants of a single phoneme

language dependent (sing vs. sin)

System of layers in FGD (cont.)

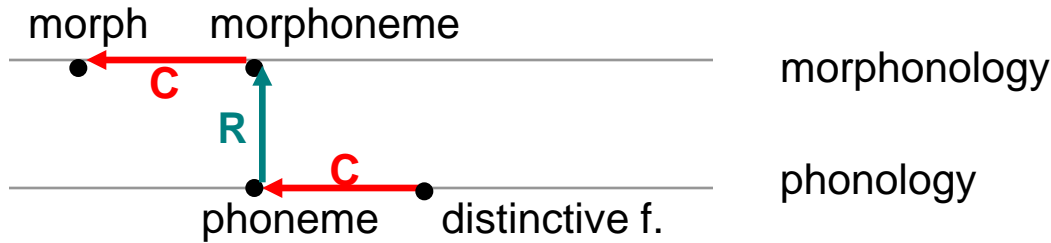


layer of morphonology

morphoneme ~ set of phoneme variants

e.g. $k|c|č|.k$ in "matka"
 $oo|ee$ in "foot"

System of layers in FGD (cont.)



layer of morphonology

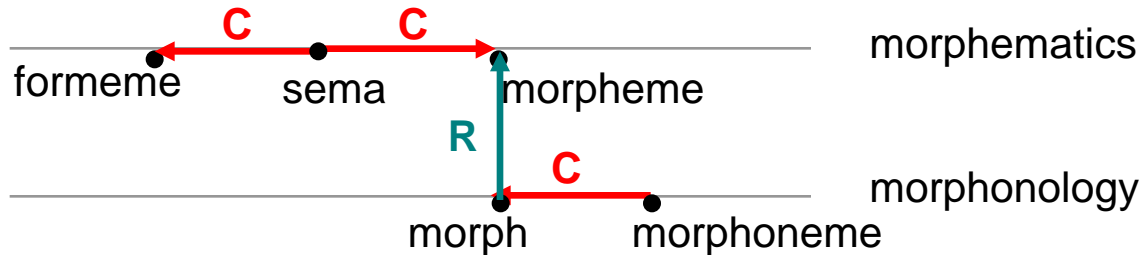
morphoneme ~ set of phoneme variants e.g. $k|c|č|.k$ in "matka"

morph ~ string of morphonemes

lexical variants (*matk, matc, matč, mat.k*) ... 4 allomorphs
 $mat(k|c|č|.k)$ 1 morph

lexical variants (*foot, feet*) ... 2 allomorphs
 $f(oo|ee)t$ 1 morph

System of layers in FGD (cont.)



layer of morphematics

morpheme ~ the smallest component that has semantic meaning

- lexical morpheme

- roots

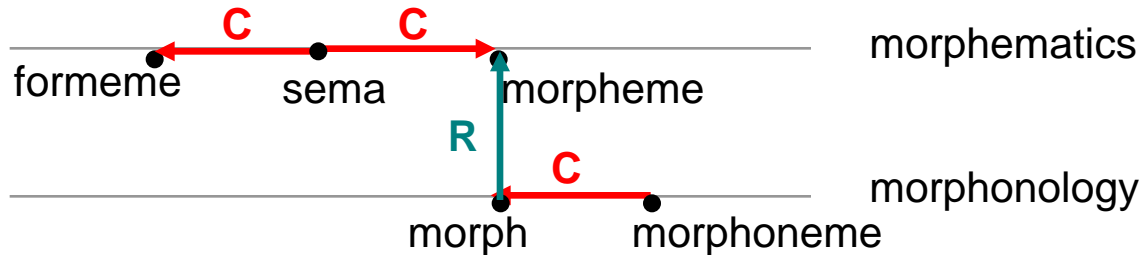
- e.g. lex. morpheme for *matka* consists of 4 allomorphs (*matk*, *matc*, *matč*, *mat.k*) ;
for *to write* (*writ*, *wrot*); for *leaf* (*leaf*, *leav*)

- derivational morphemes (affixes: prefixes, infixes, suffixes, ...)

- il-* (as in *illegal*), *non-* (as in *nonproblematic*)

- ly* (as in *legally*), *-ess* (as in *actress*)

System of layers in FGD (cont.)



layer of morphematics

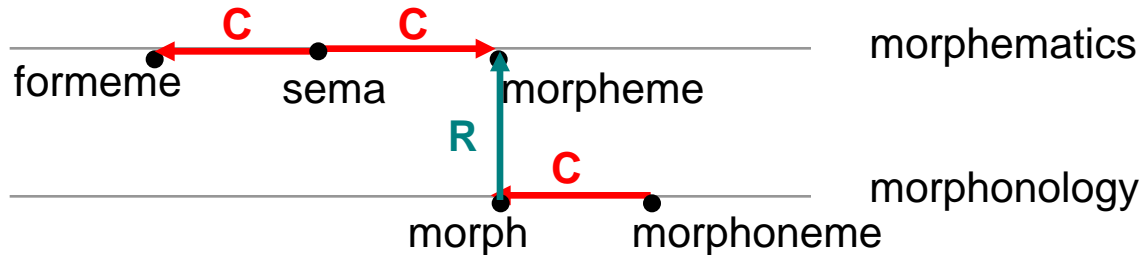
morpheme ~ the smallest component that has semantic meaning

- lexical morpheme

- grammatical morpheme

- inflectional affixes e.g. Cz: suffixes nouns: case, gender, number, ...
verbs: gender, number, tense, voice,
Eng: suffixes nouns: plural -s
verbs: past tense *-ed* , continuous *-ing*

System of layers in FGD (cont.)



layer of morphematics

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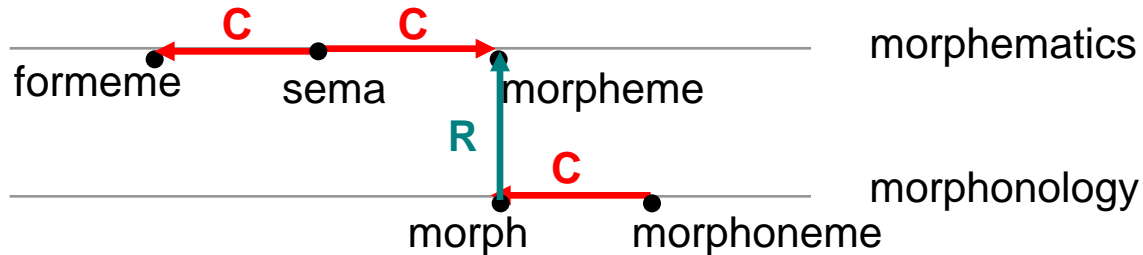
verbs: past tense *-ed* , continuous *-ing*

e.g. *matk + a*
koup + il

boy + s
play + ed

- sema ... a combination of grammatical morphemes that characterize a lexical morpheme (or strings of lexical morphemes)

System of layers in FGD (cont.)



layer of morphematics

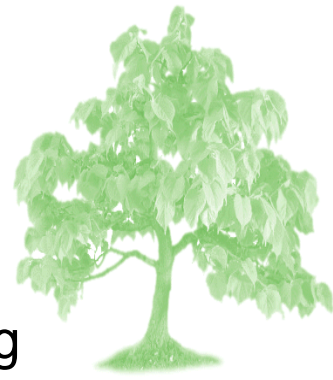
morpheme ~ the smallest component that has semantic meaning

- lexical morpheme
- grammatical morpheme
- formeme:

sequence of morphs realizing a single tagmeme / sentence member
lexical f., case f. (i.e., prep+case), conjunction formemes (i.e., conj+verb mood)

Cz: *vysok+á škol+a; lamp+a; na+lavic+i; chod+í; bud+e+chod+it*
Eng: *white-collar; lamp; on+ table; walk+s; will+be+walk+ing*

System of layers in FGD (cont.)



morpheme ~ the smallest component that has semantic meaning

Czech ... (inflection language):

nejneobhospodařovatelnější

nej-ne-ob-hospod-ař-ova-teln-ějš - í

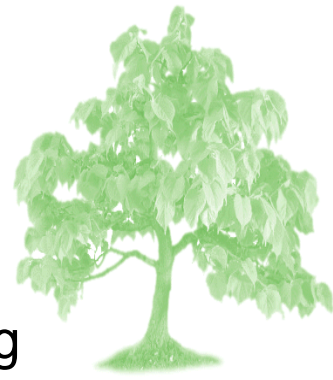
most-non-cultivate - [iter]- [adj] - [super]-[sg+nom+fem | sg+acc+neutr | ... pl+voc+masc]

root

23 combinations ("meanings")

grammatical morphemes

System of layers in FGD (cont.)



morpheme ~ the smallest component that has semantic meaning

Hungarian (agglutinative language):

fi-ú boy

fi-a his/her son

fi-á-é his/her son's (singular object)

fi-á-é-i his/her son's (plural object)

fi-a-i his/her sons

fi-a-i-é his/her sons' (singular object)

fi-a-i-é-i his/her sons' (plural object)

Turkish (agglutinative language):

Dilbilimcileştiremeyebileceklerimizdenmiydiniz?

Dilbilim-ci-leş-tir-e-me-yebil-ecek-ler-i-miz-den-mi-ydi-niz

Were you one of those whom we would not be able to transform into a linguist?

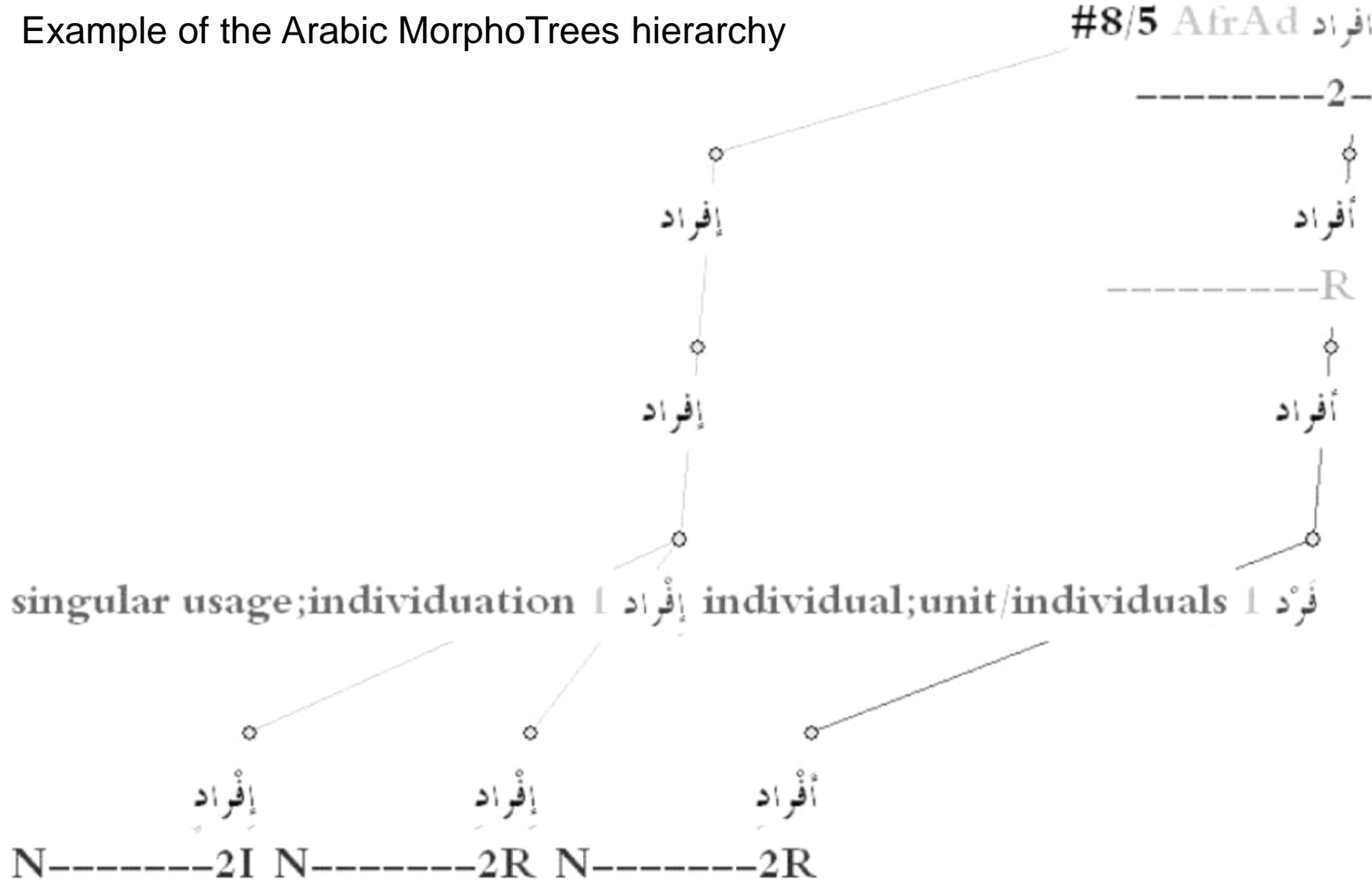
bilim<n><D_Cl><n><D_IAS><v><caus><abil><neg><abil><vn_acak><ncomp><pl><p1p><abl><q><cpl_di><2p>

Sibel Ciddi (2013)

System of layers in FGD (cont.)



Example of the Arabic MorphoTrees hierarchy



References



- Sgall, P. (1967) *Generativní popis jazyka a česká deklinace*. Academia, Praha
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