

Ling 566

Feb 6, 2019

Lexical Rules

Overview

- How lexical rules fit in
- Three types of lexical rules, constraints
- Example: Plural noun lexical rule
- Advice on writing lexical rules
- Constant lexemes
- ARG-ST & ARP
- The feature FORM

Lexical Types & Lexical Rules

- Lexemes capture the similarities among *run*, *runs*, *running*, and *ran*
- The lexical type hierarchy captures the similarities among *run*, *sleep*, and *laugh*, among those and other verbs like *devour* and *hand*, and among those and other words like *book*.
- Lexical rules capture the similarities among *runs*, *sleeps*, *devours*, *hands*, ...

Parsimony & Plausibility

- Lexical rules capture **productive** generalizations.
- There may be some ‘precompiling’ going on as well.

Three Kinds of Lexical Rules

- Inflectional: *lexeme to word*

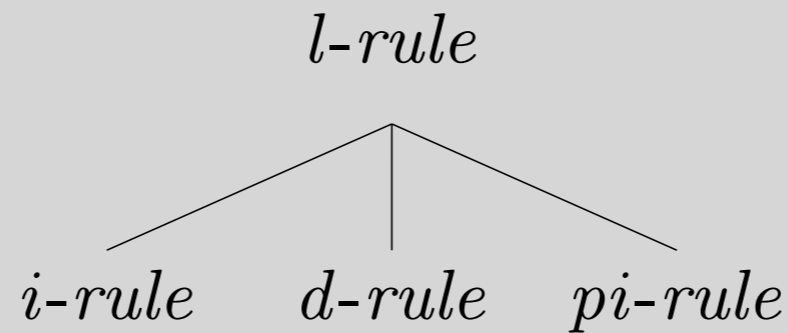
Examples?

- Derivational: *lexeme to lexeme*

Examples?

- Post-Inflectional: *word to word*
(Chapters 11, 13, 14)

Three Subtypes of *l-rule*

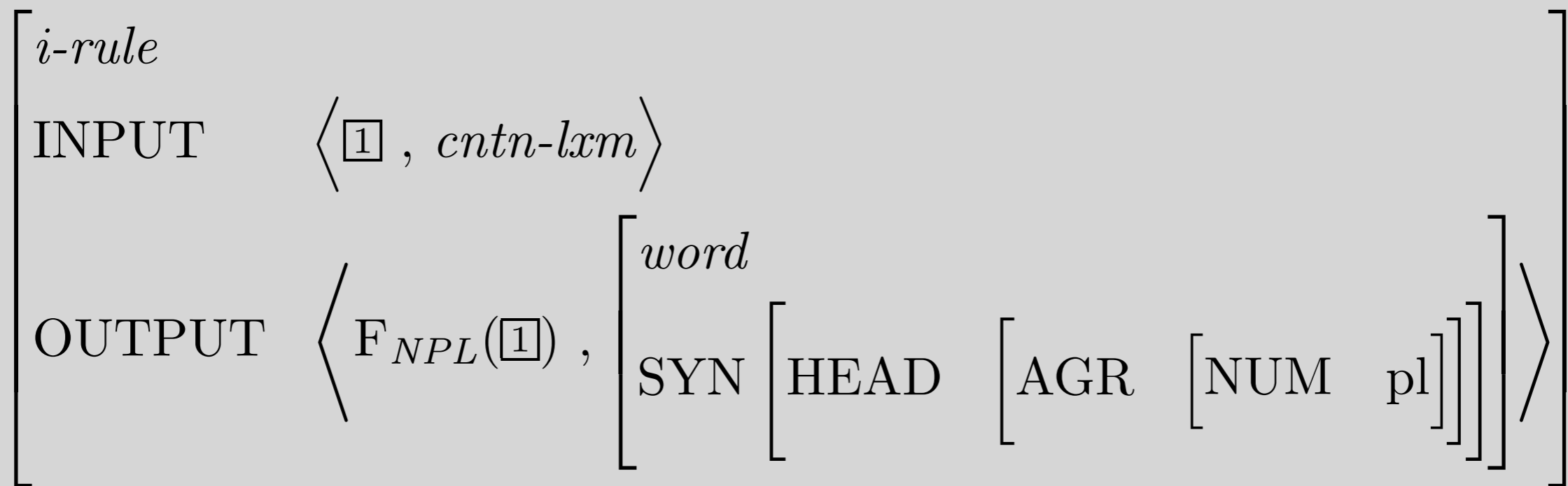


$$l\text{-rule} : \left[\begin{array}{l} \text{INPUT} \quad l\text{-sequence} \left\langle X, [\text{SEM} \quad / \boxed{2}] \right\rangle \\ \text{OUTPUT} \quad l\text{-sequence} \left\langle Y, [\text{SEM} \quad / \boxed{2}] \right\rangle \end{array} \right]$$

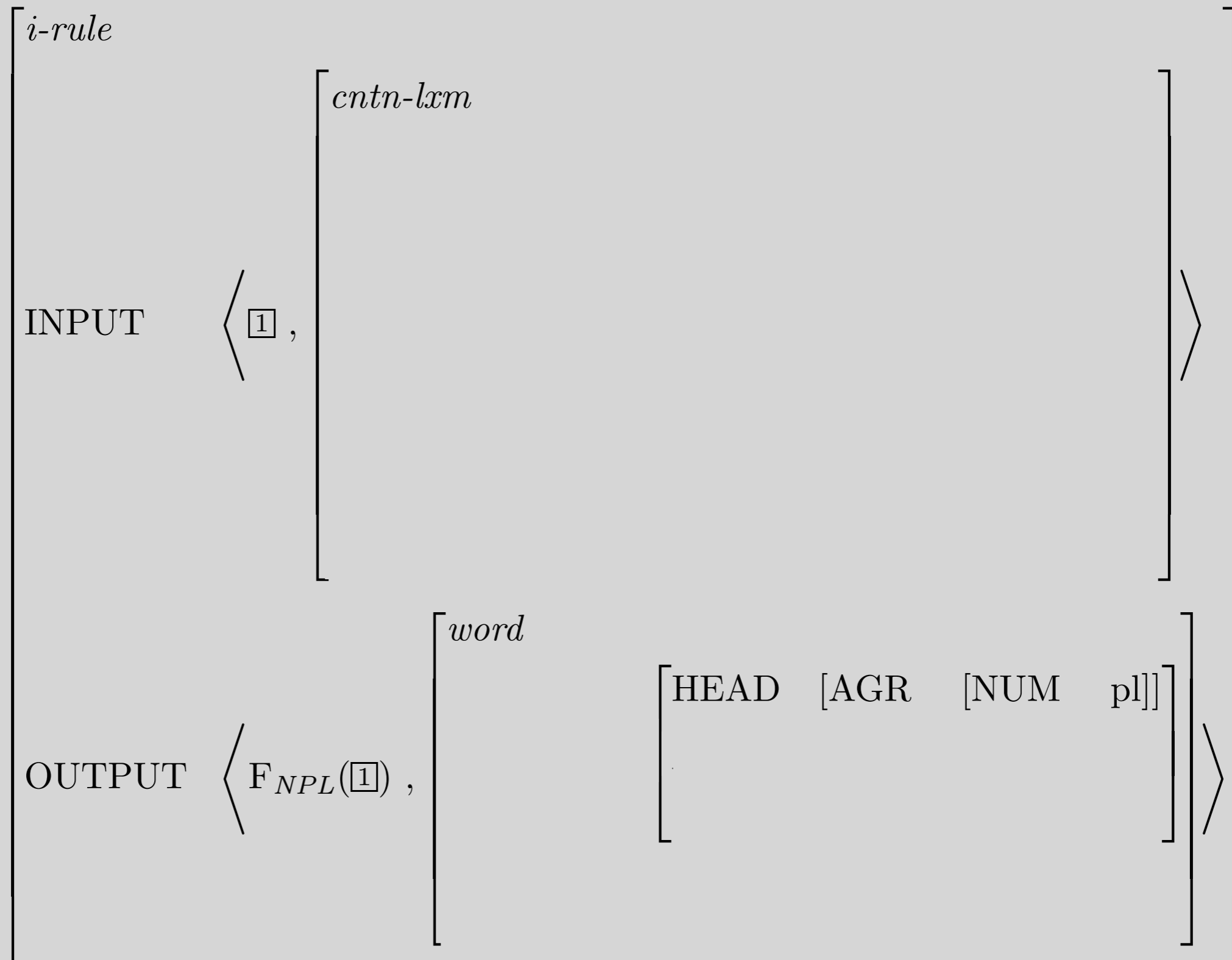
$$i\text{-rule} : \left[\begin{array}{l} \text{INPUT} \quad \left\langle X, \left[\begin{array}{l} \textit{lexeme} \\ \text{SYN} \quad \boxed{3} \\ \text{ARG-ST} \quad \boxed{A} \end{array} \right] \right\rangle \\ \text{OUTPUT} \quad \left\langle Y, \left[\begin{array}{l} \textit{word} \\ \text{SYN} \quad \boxed{3} \\ \text{ARG-ST} \quad \boxed{A} \end{array} \right] \right\rangle \end{array} \right]$$

$$d\text{-rule} : \left[\begin{array}{l} \text{INPUT} \quad \left\langle X, \left[\begin{array}{l} \textit{lexeme} \\ \text{SYN} \quad / \boxed{3} \end{array} \right] \right\rangle \\ \text{OUTPUT} \quad \left\langle Y, \left[\begin{array}{l} \textit{lexeme} \\ \text{SYN} \quad / \boxed{3} \end{array} \right] \right\rangle \end{array} \right]$$

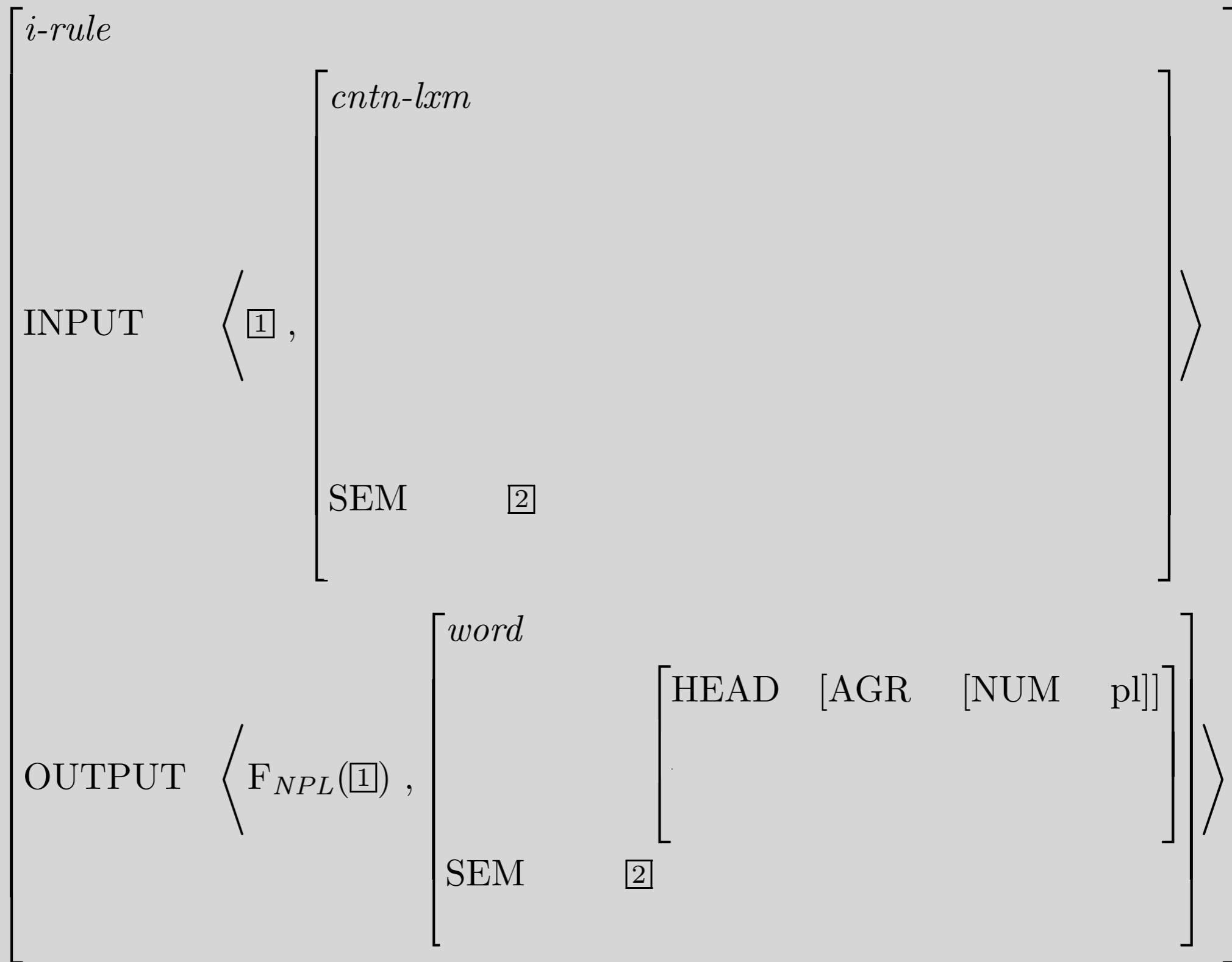
Plural Noun LR



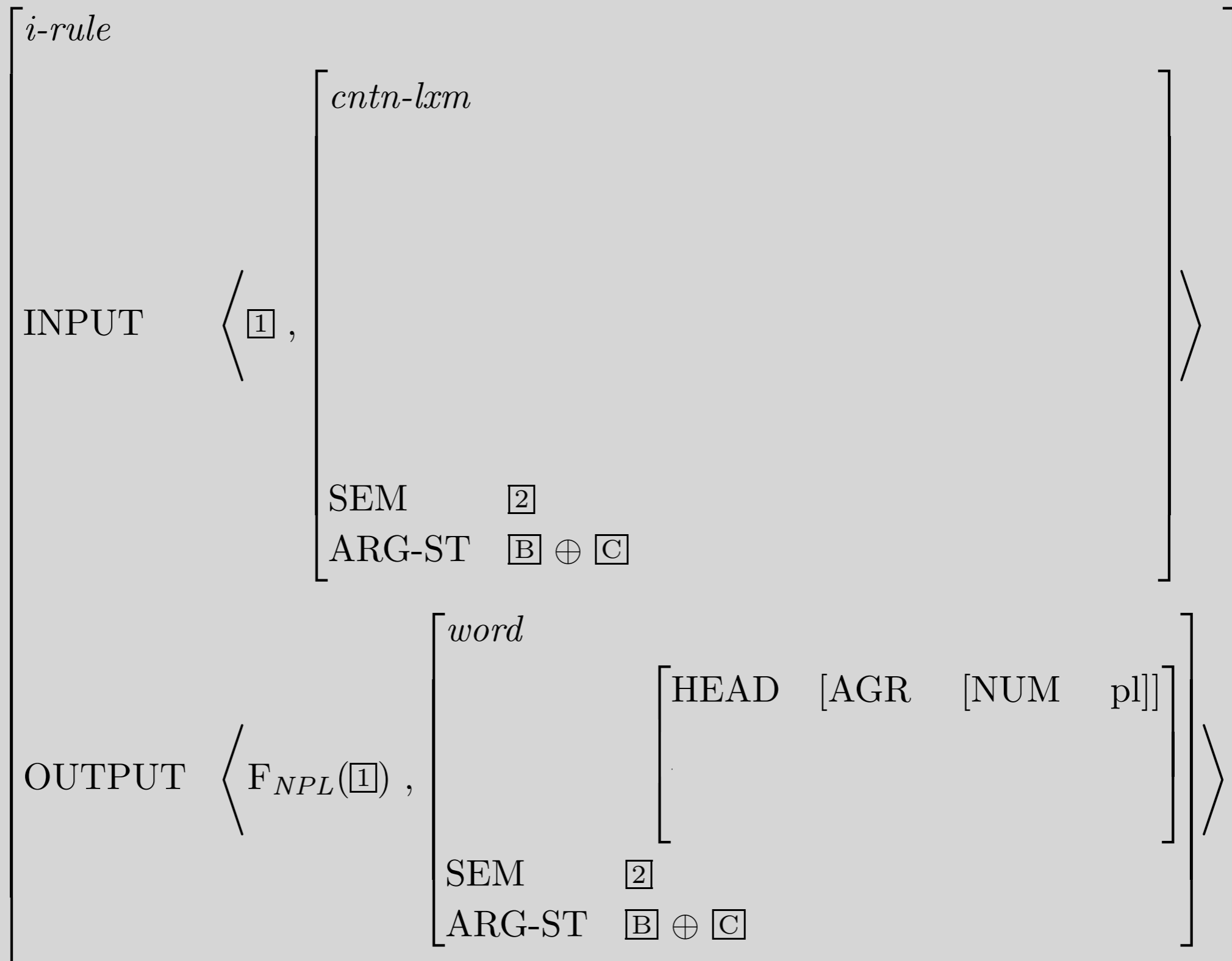
Plural Noun LR with Inherited Constraints



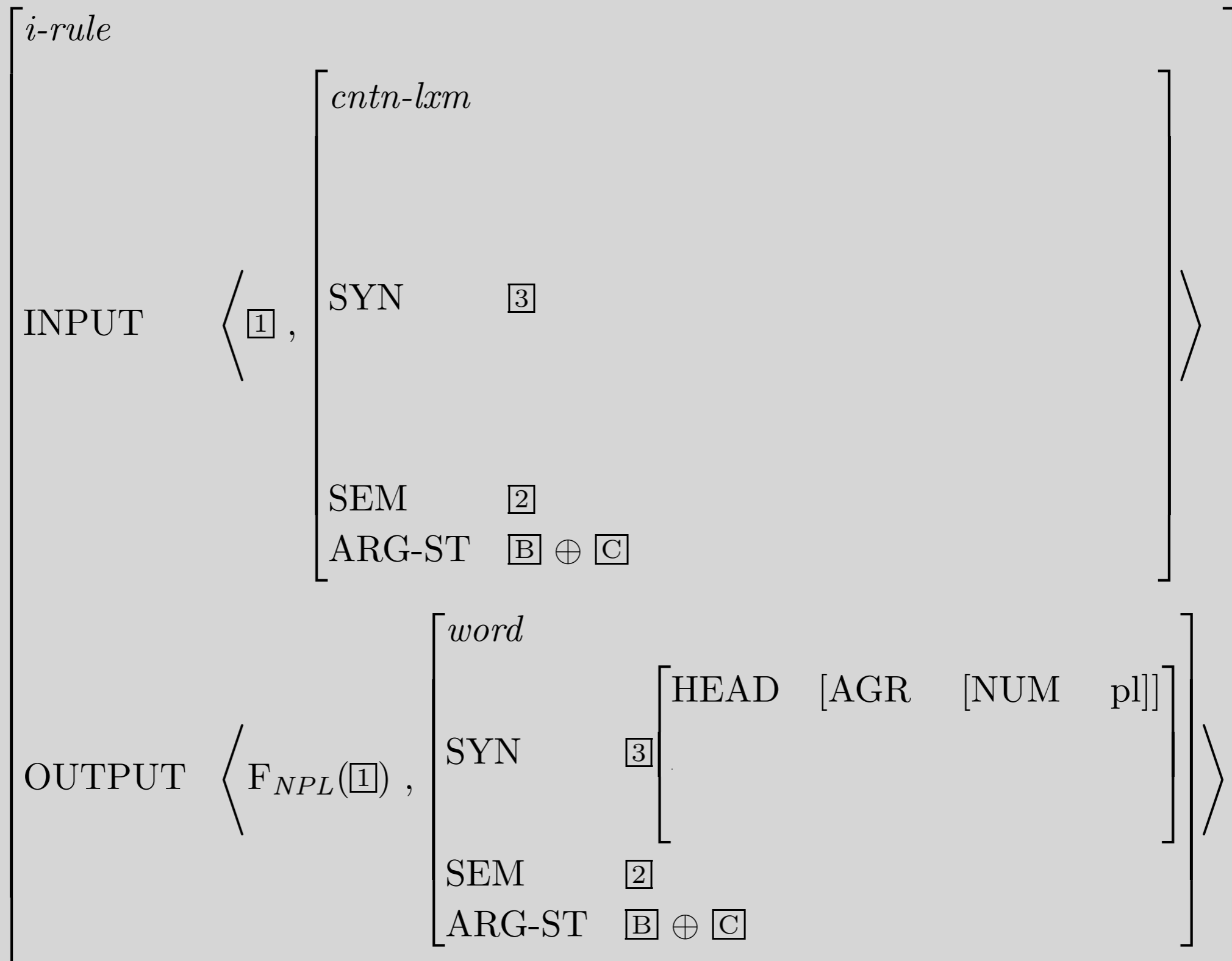
Plural Noun LR with Inherited Constraints



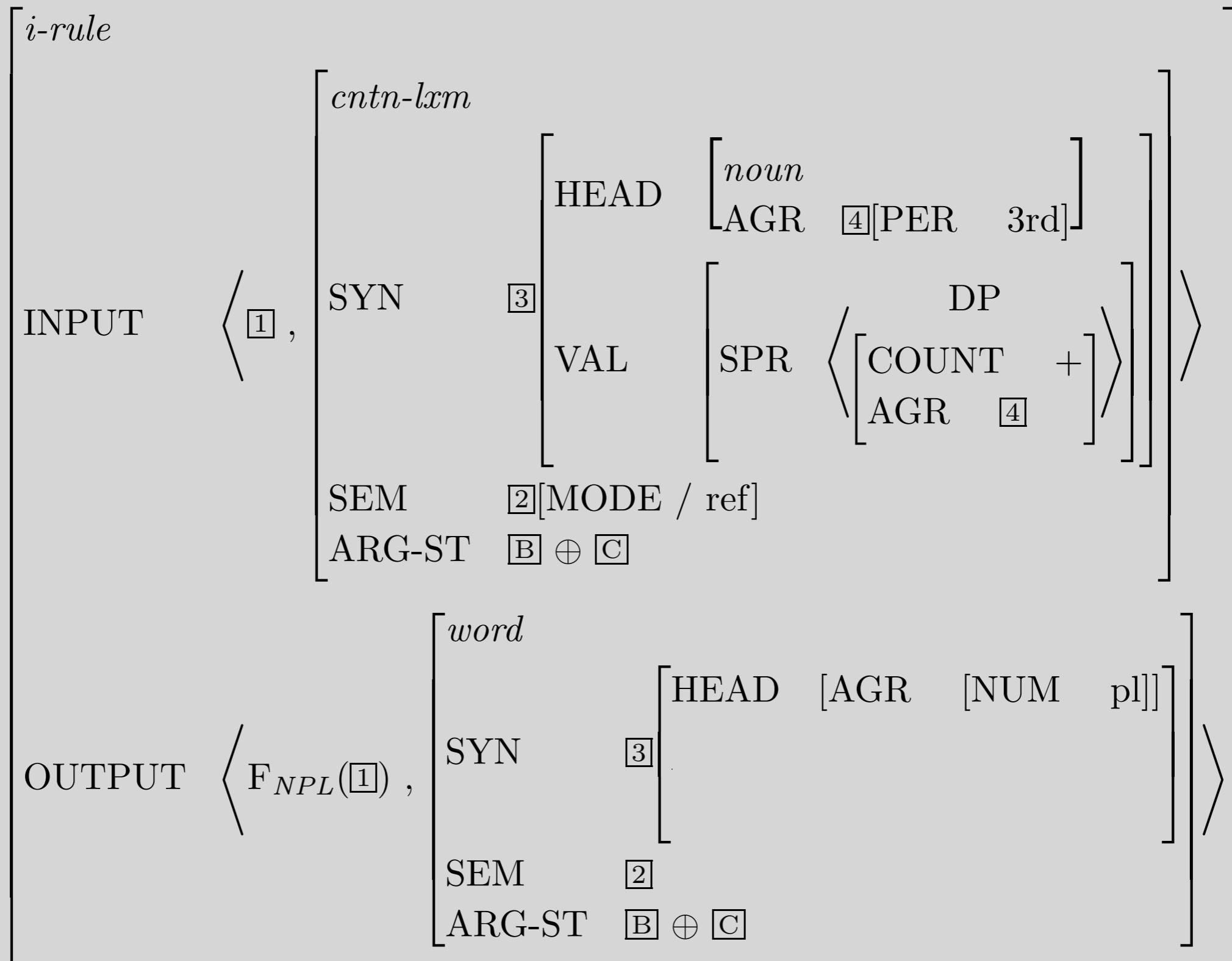
Plural Noun LR with Inherited Constraints



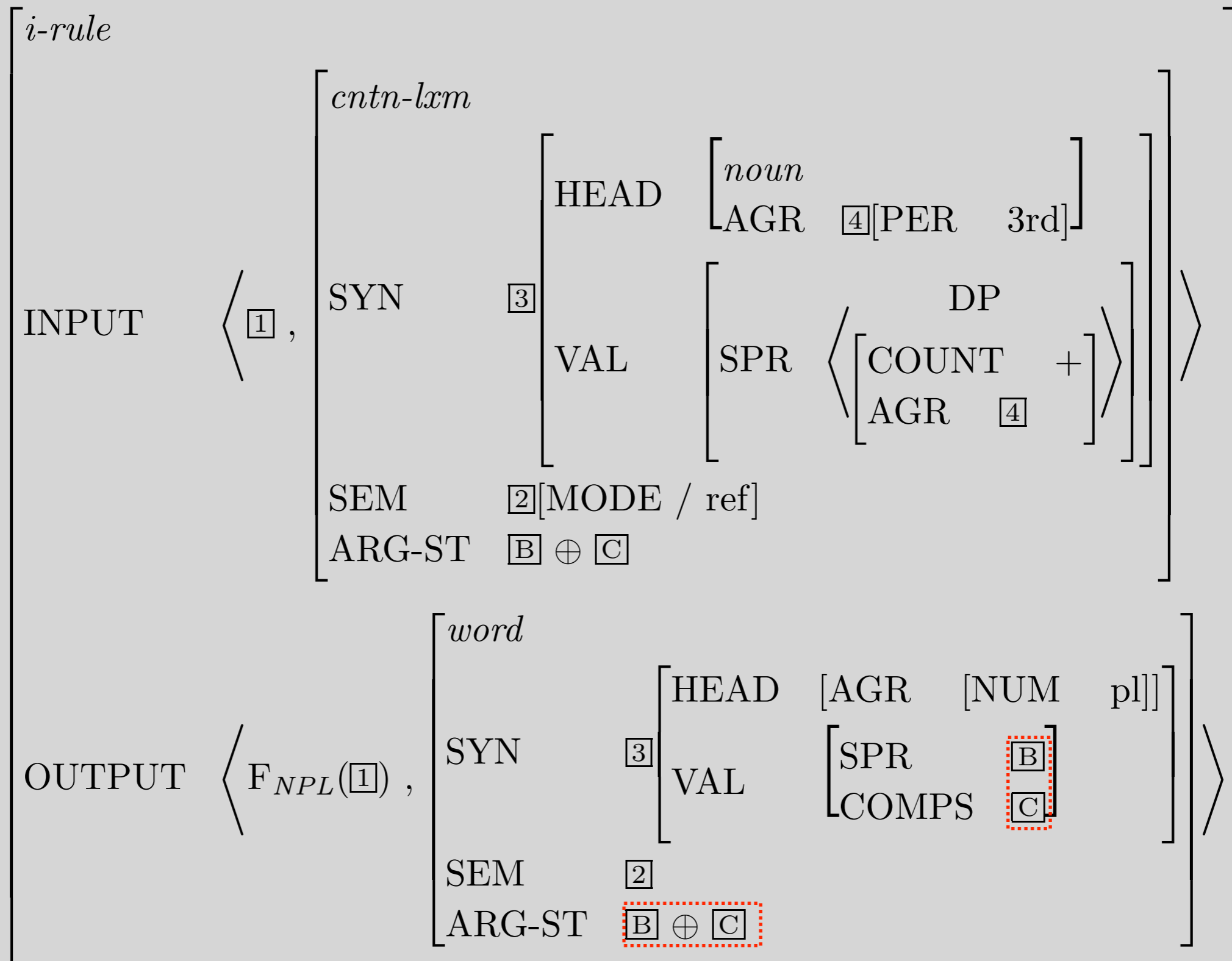
Plural Noun LR with Inherited Constraints



Plural Noun LR with Inherited Constraints



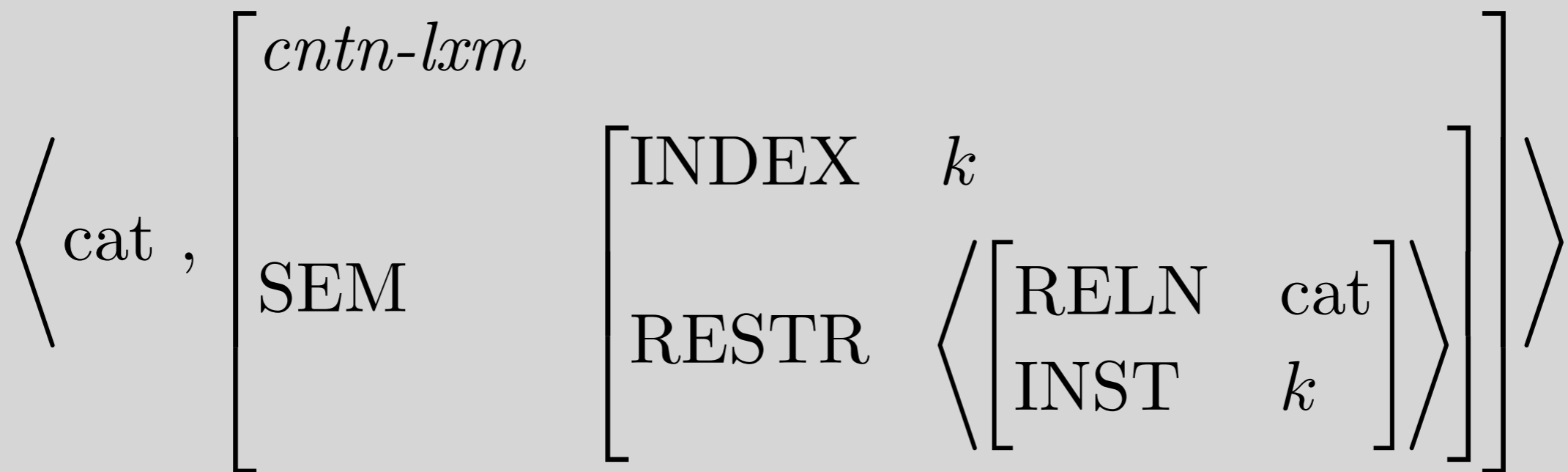
Plural Noun LR with Inherited Constraints



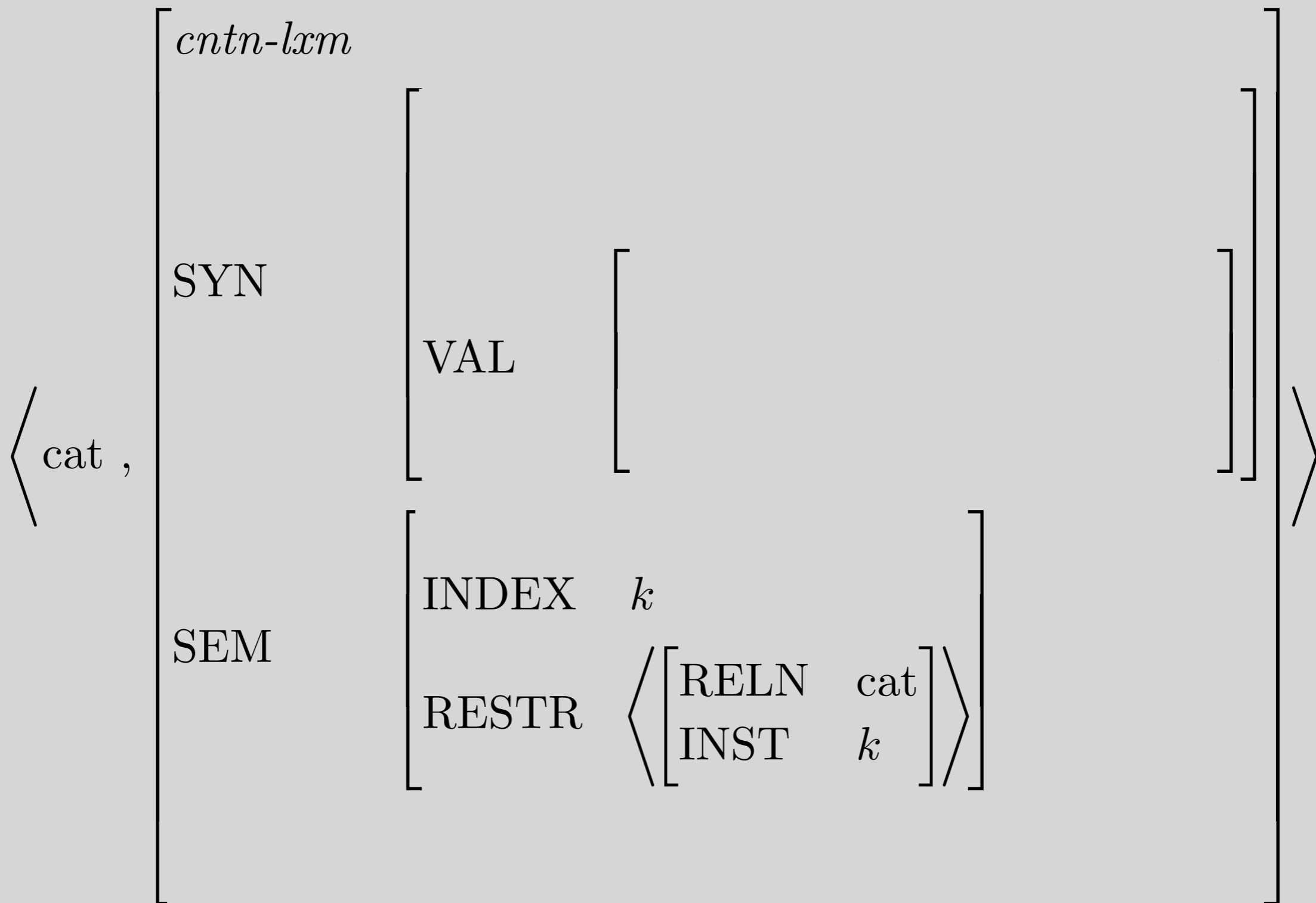
Practicalities - Applying Lexical Rules

- INPUT is a family of lexical sequences.
- OUTPUT is another family of lexical sequences.
 - ...usually a smaller family
 - ...usually a disjoint one
- The only differences between the families are those stipulated in the rule (or the rule's type).
- Similarities are handled by the constraints on *l-rule* and its subtypes.
- If we've written the LR's correctly, nothing is left underconstrained.

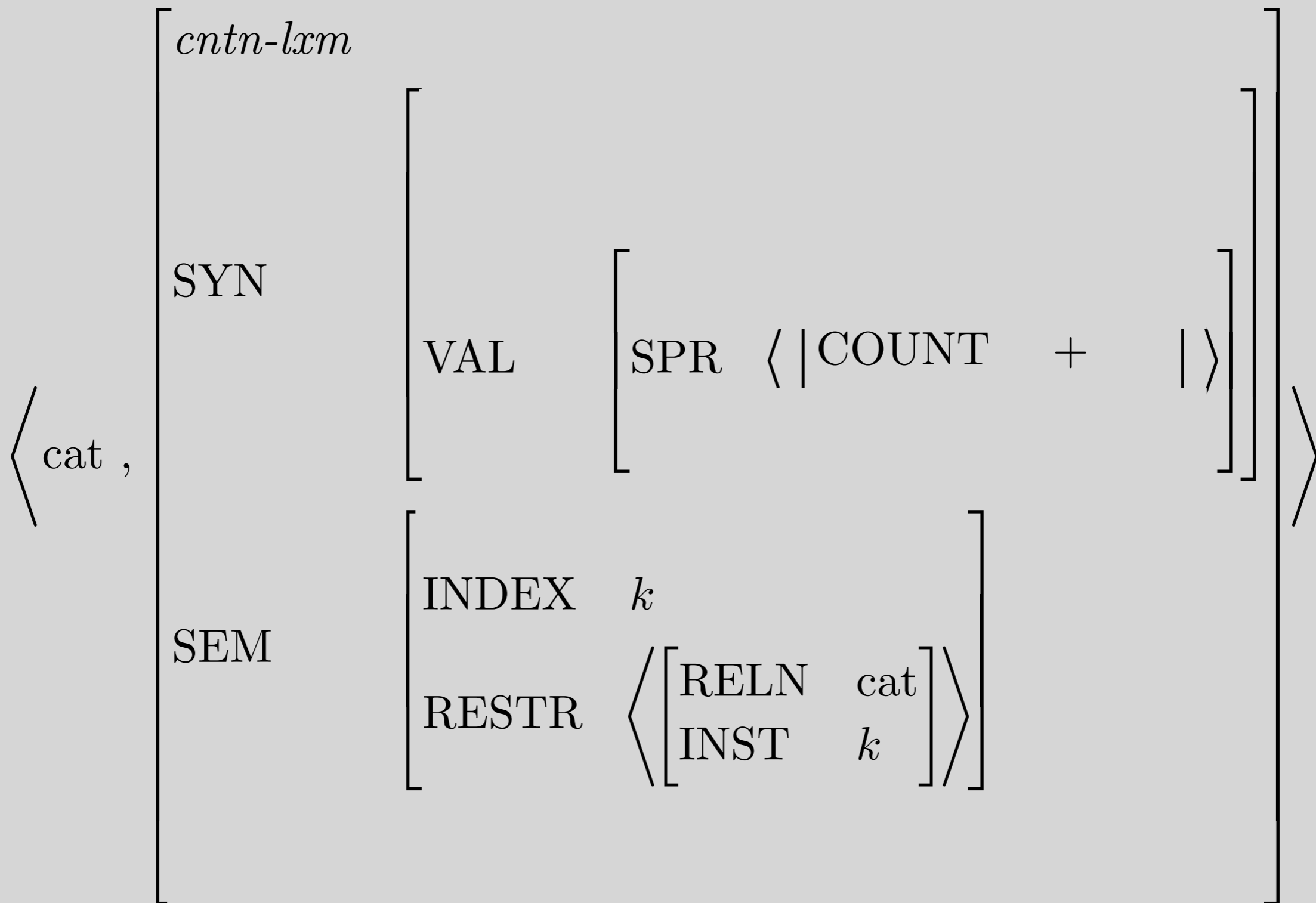
Example: Lexical Entry for *cat*



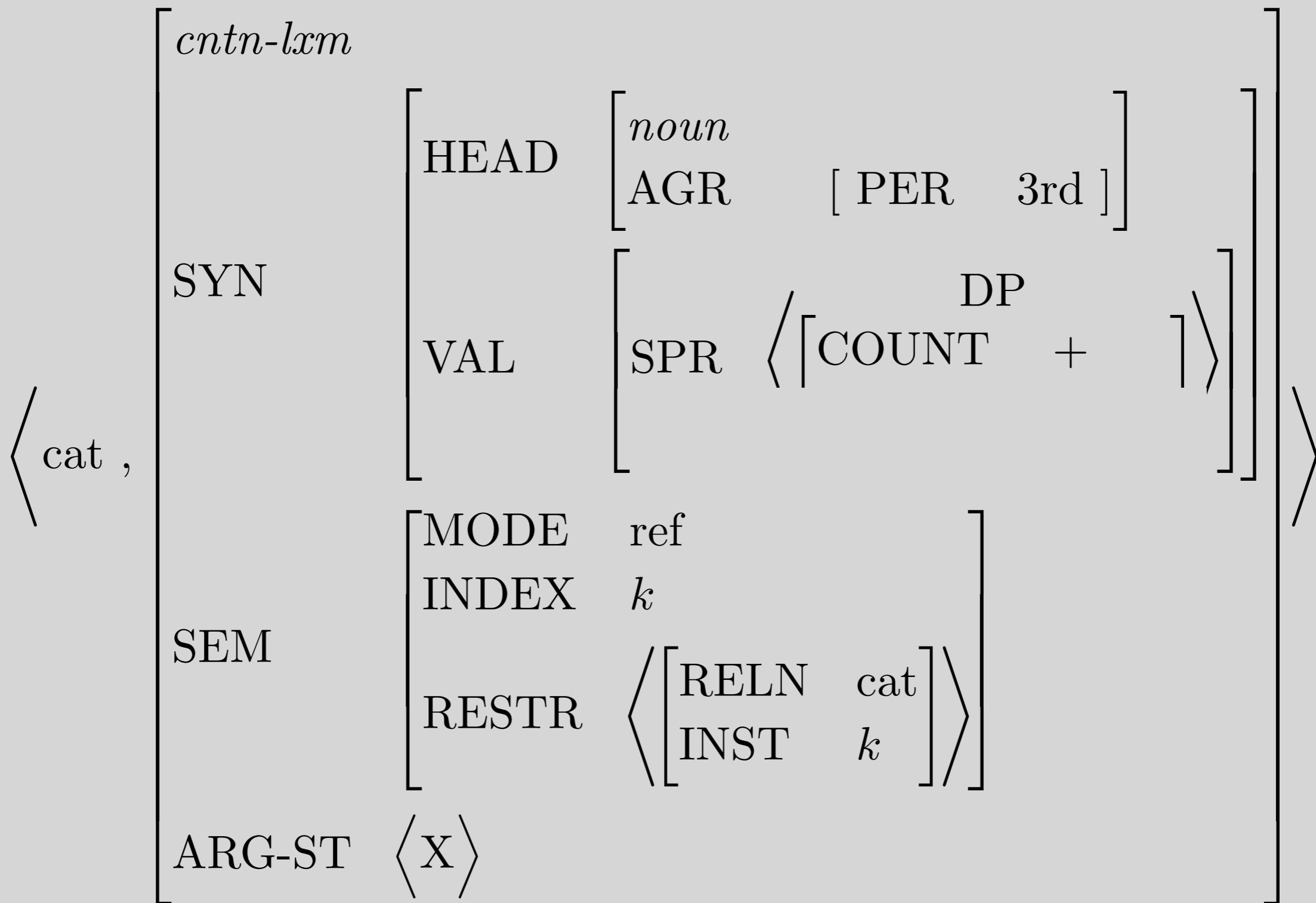
Example: *cat*, with inheritance



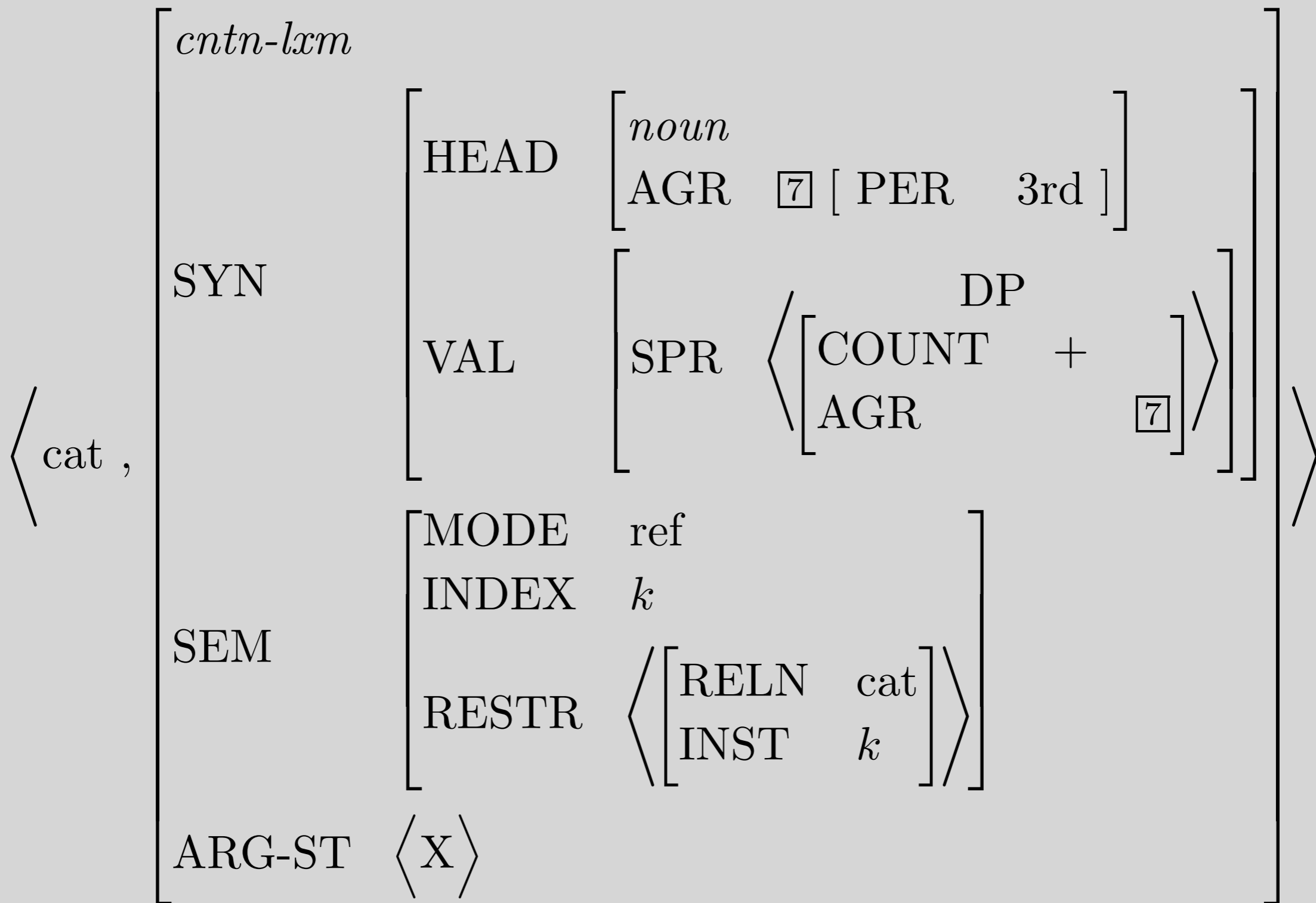
Example: *cat*, with inheritance



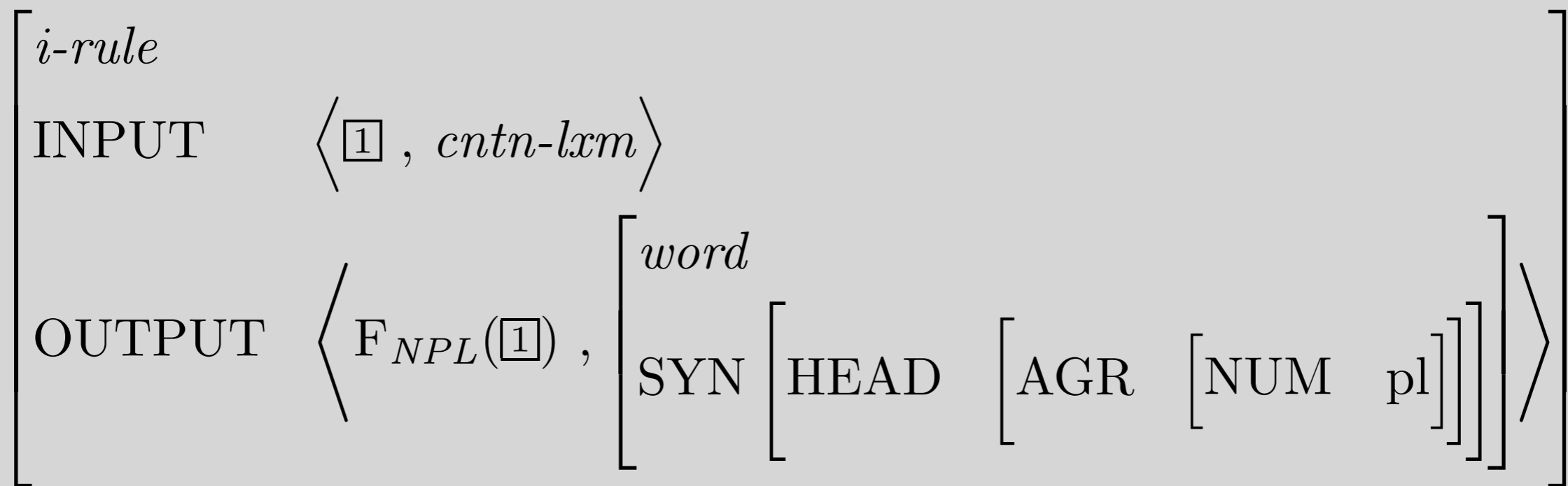
Example: *cat*, with inheritance



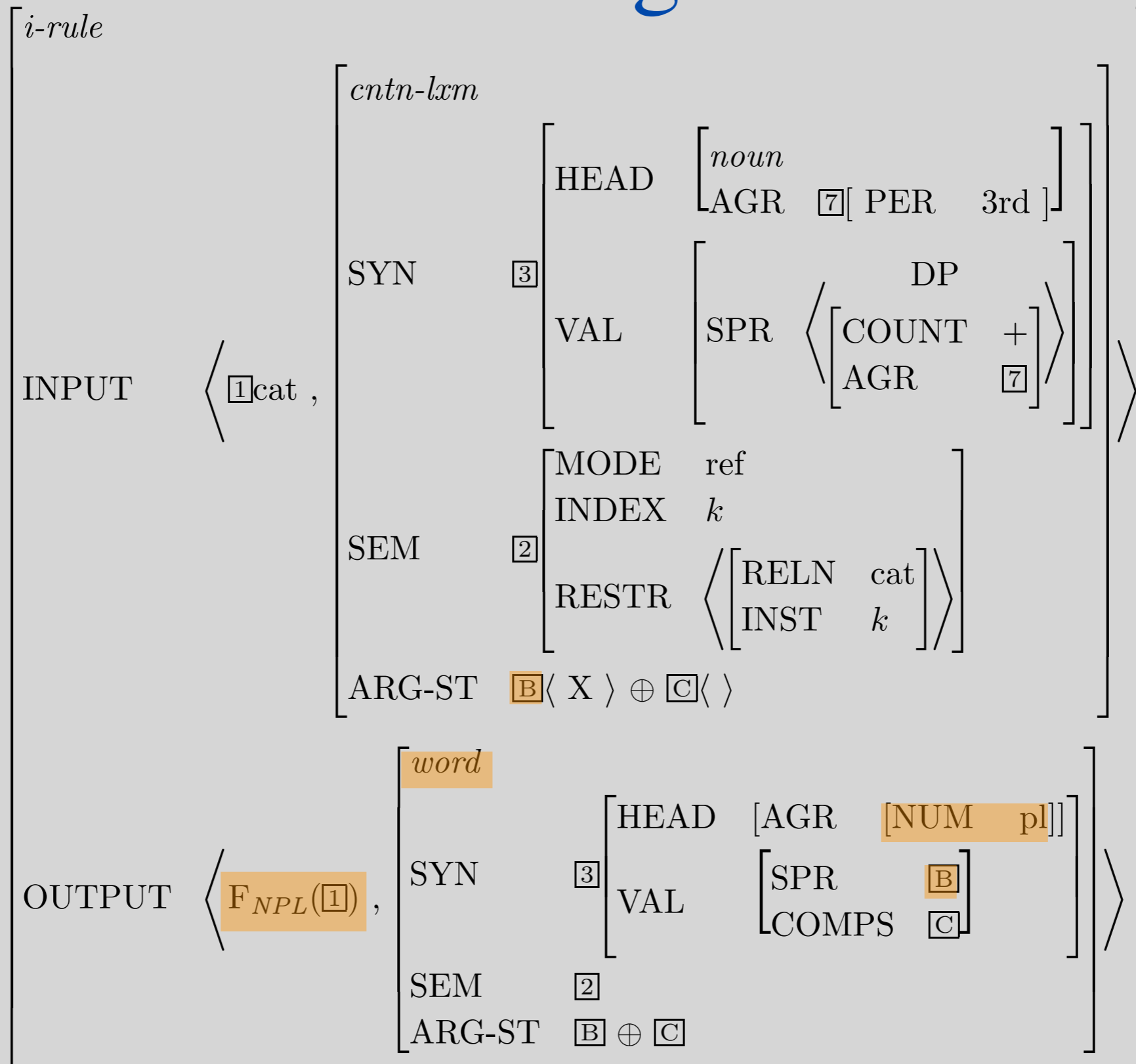
Example: *cat*, with inheritance



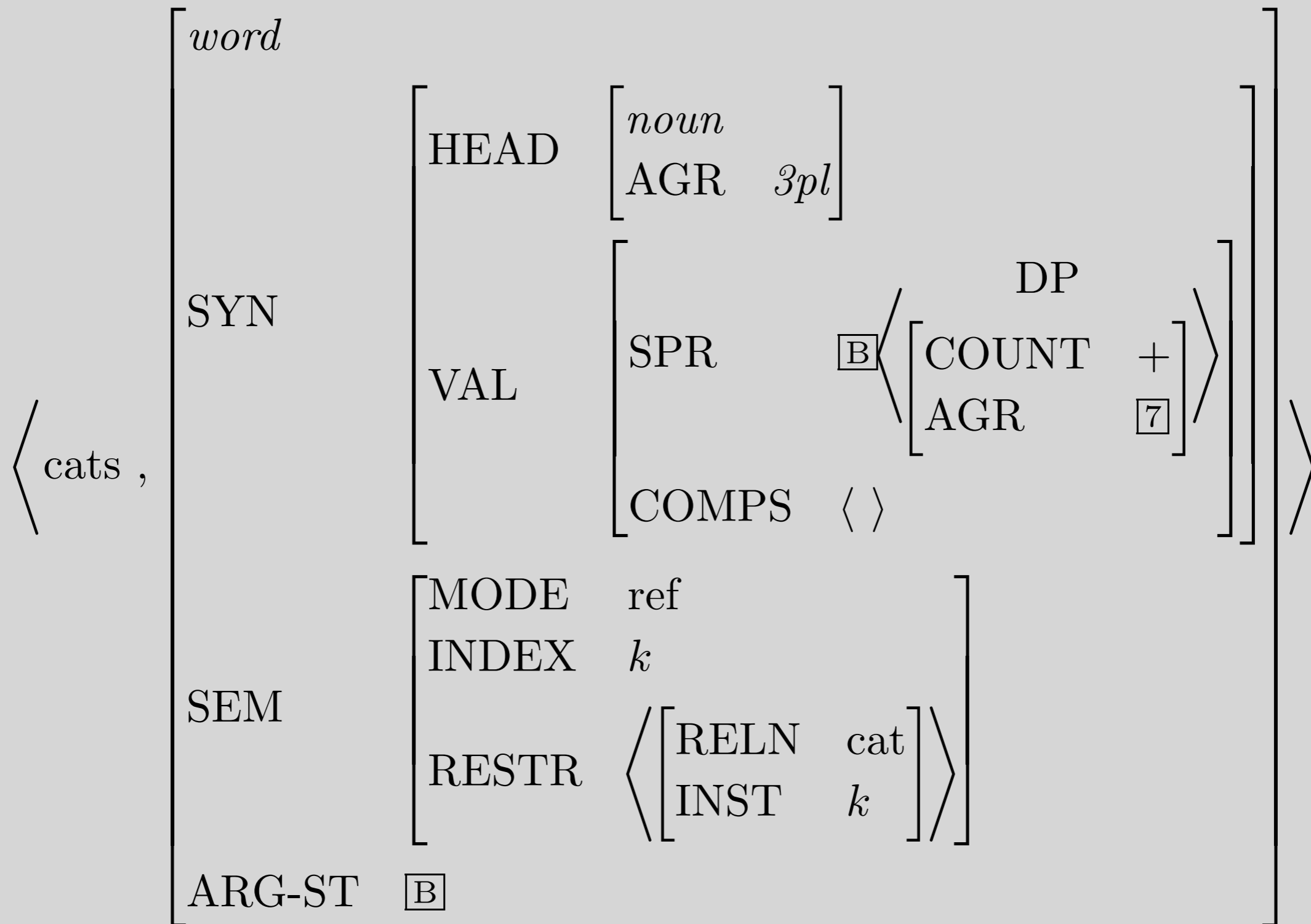
Plural Noun LR



Licensing *cats*



cats: The Lexical Sequence



Practicalities -- Writing Lexical Rules

- Determine the type of the LR.
- Determine the class of possible inputs.
- Determine what should change.
 - If INPUT and OUTPUT values are identified (by default or otherwise) and only OUTPUT value is mentioned, then...
information is added.

(Lexical sequences incompatible with that value are not possible inputs)
 - If INPUT and OUTPUT values are identified by default, but different values are given on the INPUT and OUTPUT of the rule, then...
information is changed.
 - If INPUT and OUTPUT values are identified by an inviolable constraint, but different values are given on the INPUT and OUTPUT of the rule, then...
there is no well-formed output

Constant lexemes

- What kinds of words are constant lexemes in our grammar?
- Why do we need a rule for these words?
- What would be an alternative analysis?

Constant Lexeme LR

<i>i-rule</i>	
INPUT	$\langle \boxed{1}, \textit{const-lxm} \rangle$
OUTPUT	$[\textit{FIRST} \quad \boxed{1}]$

- What keeps this from applying to, say, verb lexemes?
- Why is this an *i-rule*?

ARG-ST & ARP

- Given the ARP, what do we need to specify about the valence properties of words?
- Why isn't the ARP a constraint on the type *lexeme*?

The Feature FORM

- Different inflected forms of verbs show up in different syntactic environments. Examples?
- These different forms are syntactically distinguished by the feature FORM, as assigned by lexical rules.
- FORM is also useful in our analyses of coordination and PP selection.

How do we rule these out?

- *Kim eat pizza.
- *Kim seems to eats pizza.
- *Dana helped Leslie [pack and moved].
- *Kim relies for Sandy.
- *Dana walked and Kim.

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- Reading Questions

Reading Questions

- How would we implement Fpast, in an actual grammar, to handle irregular verbs that follow different patterns, such as sing–sang–sung and keep–kept–kept? I am guessing we will have to hardcode these patterns.
- What about subregularities (e.g. $y \rightarrow ies$, in both plural nouns and 3sg verbs?)

Reading Questions

- When I was in middle school, there was a prestigious student classroom appointment called *paper passer outer*. This *passer outer* phrase seems to follow a general derivational rule that can also generate examples like *picker upper*, *putter downer*, etc. Arguably, *passer out* could seem more standard (though still pretty questionable?), but either way, it seems like the semantic sense of the derivation here is actually working on the whole VP *pass out*. The *out* still acts as if it's on the COMPS list of the underlying verb *pass*, and the *-er* seems to modify that whole unit, rather than just the verb. This all made me wonder whether and how derivational rules might be applied above word level to "lexicalize" or otherwise modify phrases or other fragments. Is this at all relevant to the discussion of idioms to come in the later chapter?

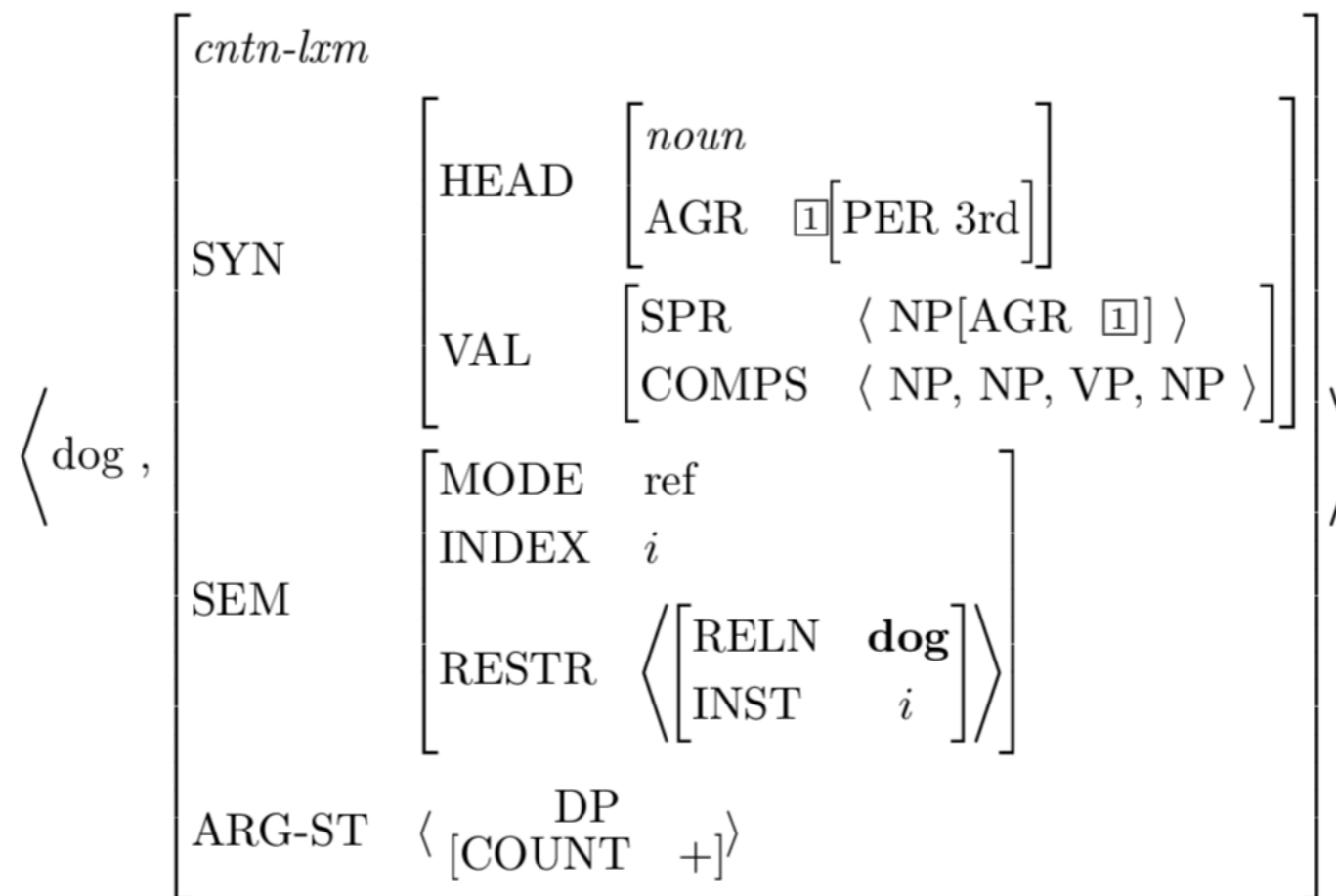
Reading Questions

- What is the difference between a rule, a constraint, and a principle as those terms are used in this text?

Reading Questions

- Why can't the lexical sequence in (74) give rise to any words? What makes it so "crazy"?

(74) A lexical sequence that doesn't give rise to any words



Reading Questions

- Why is the identity between INPUT and OUTPUT SEM on l-rule a defeasible constraint?

$$l\text{-rule} : \left[\begin{array}{l} \text{INPUT} \quad l\text{-sequence} \langle X, [\text{SEM} / \boxed{2}] \rangle \\ \text{OUTPUT} \quad l\text{-sequence} \langle Y, [\text{SEM} / \boxed{2}] \rangle \end{array} \right]$$

- Where's the semantic reflex of 'plural' in the Plural Noun LR?
- Are we ignoring the semantics because the focus is syntax, or because there's anything particularly difficult about it?

Reading Questions

- In the Agent Nominalization Lexical Rule (76), what part of the rule specifies that the index of the OUTPUT must be identified with the agent role of a predication in its RESTR list (as in 78)? I understand why this co-indexing is necessary, I'm just not sure where it's actually formalized in the rule. Or if it's not, this seems like a time where having over-generalized categories like "agent" and "patient" in our semantics might be helpful?

Reading Questions

Agent Nominalization Lexical Rule

$$\left[\begin{array}{l}
 \text{INPUT} \\
 \text{OUTPUT}
 \end{array} \right.
 \begin{array}{l}
 \left[\begin{array}{l}
 \text{d-rule} \\
 \left[\begin{array}{l}
 \text{SEM} \\
 \text{ARG-ST}
 \end{array} \right]
 \end{array} \right. \\
 \left[\begin{array}{l}
 \text{cntn-lxm} \\
 \text{SEM} \\
 \text{ARG-ST}
 \end{array} \right]
 \end{array}
 \left. \right]$$

INPUT $\left\langle \boxed{2}, \left[\begin{array}{l} \text{stv-lxm} \\ \text{SEM} \left[\text{INDEX } s \right] \\ \text{ARG-ST} \langle X_i, \text{NP}_j \rangle \end{array} \right] \right\rangle$

OUTPUT $\left\langle \text{F}_{-er}(\boxed{2}), \left[\begin{array}{l} \text{cntn-lxm} \\ \text{SEM} \left[\text{INDEX } i \right] \\ \text{ARG-ST} \left\langle Y \left(\begin{array}{l} \text{PP}_j \\ \text{FORM of} \end{array} \right) \right\rangle \right] \right\rangle$

Reading Questions

- Because some words like eat can be both transitive and intransitive: They eat a cake / I eat. Does the agent nominalization rule on pg. 260 ex. (76) license "eater" with this rule? Since the rule ARG-ST says the verb must be transitive? If so, is there any harm in making elaborate derivational rules that allow for many types of lexemes?

Reading Questions

- In (76) [Agent Nominalization LR], the ARG-ST of the OUTPUT feature contains a PP with a FORM value “of”. What does this mean exactly? Is this referring to prepositional phrases that have the preposition “of”, such as “the owner (of the vehicle)”, or am I completely misunderstanding this?

Reading Questions

- For example (78) on page 261, the SHAC is overtly expressed in the lexical entry of "driver". Is that necessary? Even though it's no longer a principle in our grammar, doesn't *infl-lxm* still enforce that restriction?

Reading Questions

- I'm curious about the distinction made between FORM and tense. It seems like FORM represents tense only to the extent that it is relevant for syntactic constraints or arguments of other lexemes, is that right? So, FORM fin includes multiple tenses, but is a single category so that we can say that only FORM fin Ss can be stand-alone sentences since most of the other categories have VPs headed by auxiliary verbs (which then would all be FORM fin?). Maybe I'm misunderstanding the concept of stand-alone sentences but this doesn't seem like it always holds true. Even the tree on that page (49) has a VP with FORM base on the head - is *Kim may like Sandy* not a stand-alone sentence? Even if we assume that auxiliaries have FORM fin so that participles and passives can be formed with FORM fin, that still leaves imperatives in English, and wouldn't generalize to other languages where those tenses are inflected verb forms.

Reading Questions

- Why are imperative *eat*, infinitive *eat*, etc lumped together as one form whereas past participle *eaten* and passive *eaten* are different forms despite looking the same?
- How do we treat *to be eating*?
- What is the FORM of future tense VPs?
- If we include both the past participle form and the passive form in our grammar, even though they have identical forms, why do we not include gerund in addition to present participle?

Reading Questions

- How much more work would we have to do in section 8.7.2 to deal with verb inflection cross-linguistically?
- I'm wondering how the lexical entries and lexical rules we have now for English are different from the lexical part of a grammar for an agglutinative language. Do we have agglutinative rules in place of the inflectional rules? Do those overlap with phrase structure rules? Is the concept of 'word' altogether different?

Reading Questions

- Because derivational rules take a lexeme as input and output a lexeme (in a sense), a final word can be licensed by multiple derivations and a final inflection, right? What about derivations from inflected forms; would the input have to be recast as a lexeme? I was thinking of *abrelatas* in Spanish, which is something like `open.can.pl` and means can opener. Maybe this would be an etymology rather than a derivation because it is a compound word and the process is not totally productive?

Reading Questions

- When we build the HPSG for a language, how fine do we want to represent the morphology of the language? For English, for example, do we try to represent the syntactic and semantic structure, and write down lexical rule for the prefixes *a-*, *ab-*, *ad-*, some of which probably have different sources (Latin vs. English, for instance)? Are there general principles regarding how much morphology we want to have in our HPSG? Are there advantages vs. disadvantages in having more morphological information in our grammar?

Reading Questions

- Q about how imperatives have an NP[PER 2nd] in their specifier. The imperative rule states that the VP [specifier filled] --> V [imperative feature structure with specifier requiring 2nd person NP]. I don't understand how the imperative can specify a 2nd person NP but never have it realized in the grammar. How does the specifier slot get saturated between the V and the VP? Is this related to its non-headedness?