Computational Linguistics II: Parsing

Bottom-up Parsing

Frank Richter & Jan-Philipp Söhn

fr@sfs.uni-tuebingen.de, jp.soehn@uni-tuebingen.de

Example: Bottom-Up Parsing

Grammar:

S	$\rightarrow$	NP VP | NP VP kon VP
NP	$\rightarrow$	n
VP	$\rightarrow$	v | v PP | adv v | adv v PP
PP	$\rightarrow$	p NP
n	$\rightarrow$	Beethoven | 1827 | this
v	$\rightarrow$	expired | died
p	$\rightarrow$	in | for
kon	$\rightarrow$	and
adv	$\rightarrow$	later

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Sentence: Beethoven expired in 1827 and later died for this.

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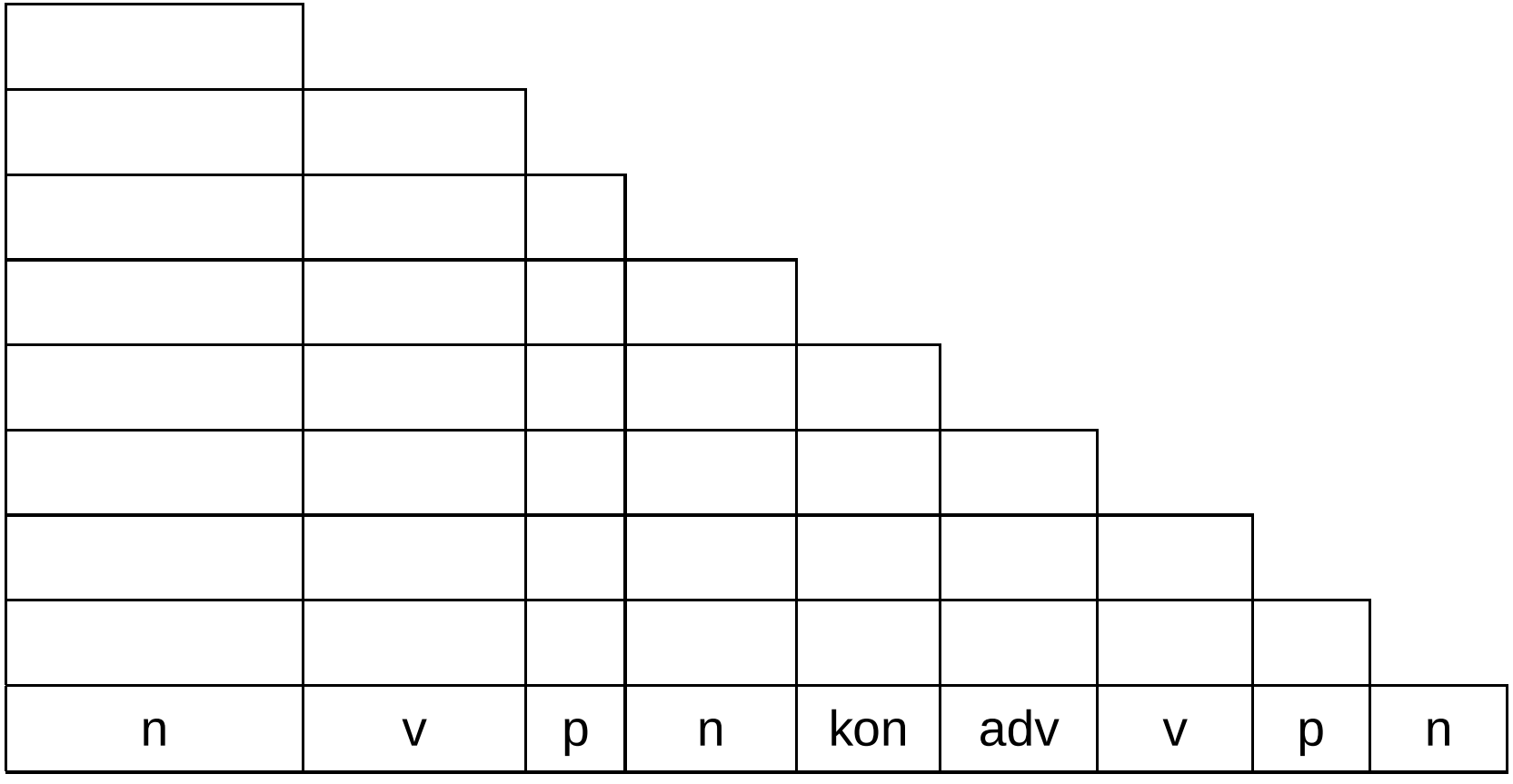
problem: often reduces in wrong situations

Bottom-Up Parsing: Chart



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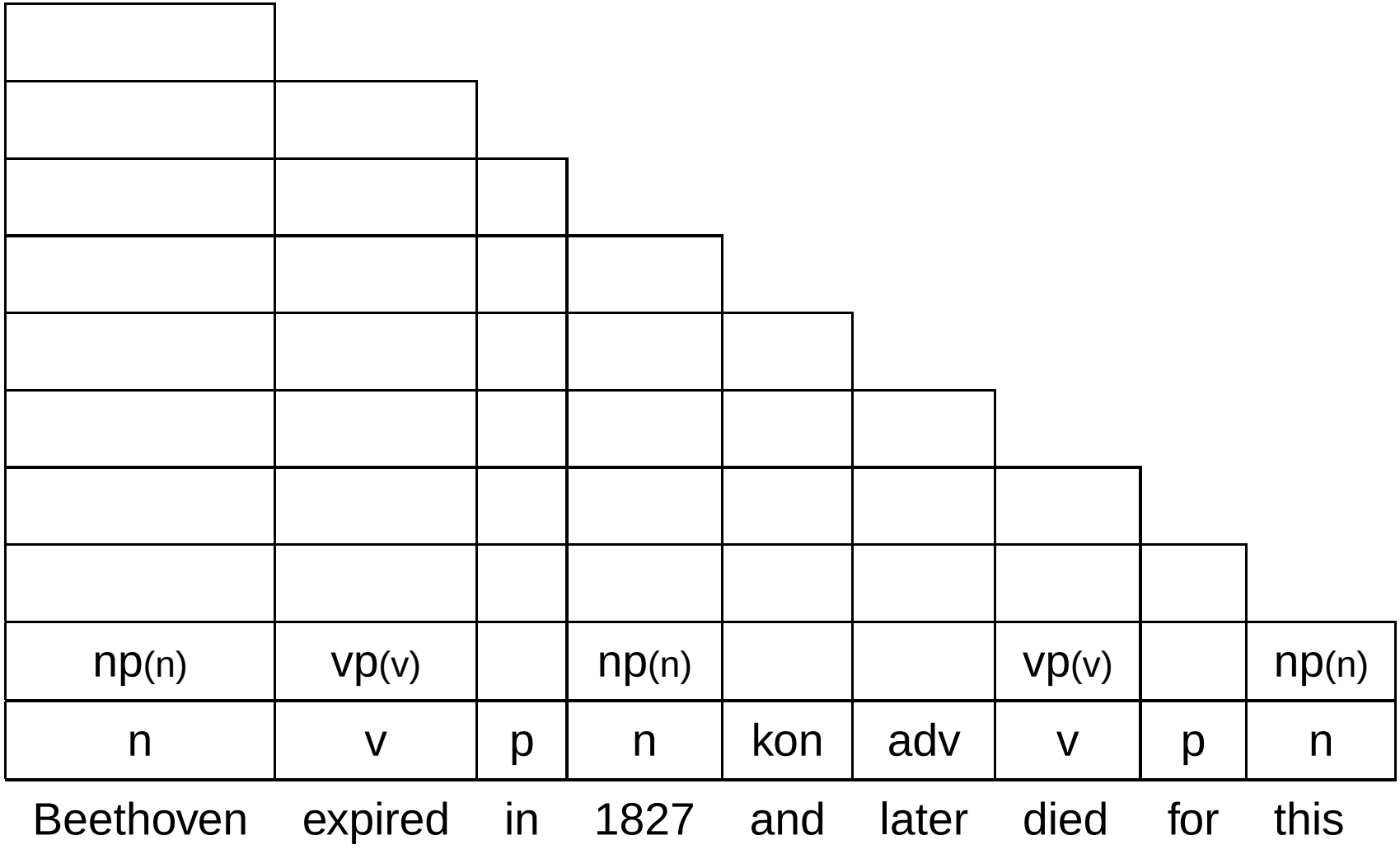

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		pp(p np)			vp(a v)		pp(p np)	
np(n)	vp(v)		np(n)			vp(v)		np(n)
n	v	p	n	kon	adv	v	p	n
B.	expired	in	1827	and	later	died	for	this

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unnecessary reductions: 5 / 13 = 38.5%

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		pp(p np)			vp(a v)		pp(p np)	
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Combining Top-Down and Bottom-Up

- problem with bottom-up: many reductions cannot be derived from start symbol
  e.g. VP $\rightarrow$ V NP PP
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- only VPs should be checked next!