Polish verb roots and affixes: an insight from inflectional allomorphy

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What's a verb root?

A a simple element (V or $\sqrt{}$)

B a complex structure (multiple heads like 'process', 'indicative', 'tense', etc.)

Goal: argue for **B**

Polish present tense inflection classes offer an insight into the syntactic complexity of verb roots and their affixes

Synopsis

- Polish present tense forms:
  1. multiple conjugations
  2. shape of suffixes (allomorphs)
  3. theme vowels
  4. types of palatalization
  5. root suppletion
- the full range of this complexity across conjugations can be captured with:
  - verb root size (cf. Ramchand 2008),
  - affix size (e.g. Taraldsen 2009, Márkus 2015, Caha et al. 2019)
  - affix shape (cf. Blix 2021, Cortiula 2023)

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4 present tense inflection classes ('class' = TV)

(1)

	I				II				III				IV			
1sg	dɔsta	j	ɛ̃		rɔbʲ	ɛ̃			čɨt	a	m		umj	ɛ	m	
2	dɔsta	j	ɛ	š	rɔbʲ	i	š		čɨt	a	š		umj	ɛ	š	
3	dɔsta	j	ɛ		rɔbʲ	i			čɨt	a			umj	ɛ		
1pl	dɔsta	j	ɛ	mɨ	rɔbʲ	i	mɨ		čɨt	a	mɨ		umj	ɛ	mɨ	
2	dɔsta	j	ɛ	tɕɛ	rɔbʲ	i	tɕɛ		čɨt	a	tɕɛ		umj	ɛ	tɕɛ	
3	dɔsta	j	ɔ̃		rɔbʲ	ɔ̃			čɨt	a(j)	ɔ̃		umj	ɛ(j)	ɔ̃	

Class I/type 1: j-suffix

(2)

	1a				**1b**			
1sg	dɔsta	j	ɛ̃		gžɛb	j	ɛ̃	
2	dɔsta	j	ɛ	š	gžɛb	j	ɛ	š
3	dɔsta	j	ɛ		gžɛb	j	ɛ	
1pl	dɔsta	j	ɛ	mɨ	gžɛb	j	ɛ	mɨ
2	dɔsta	j	ɛ	tɕɛ	gžɛb	j	ɛ	tɕɛ
3	dɔsta	j	ɔ̃		gžɛb	j	ɔ̃	

Class I/type 2: palatalization

(3)

	2a		
1sg	ss	ɛ̃	
2	sɕ	ɛ	š
3	sɕ	ɛ	
1pl	sɕ	ɛ	mɨ
2	sɕ	ɛ	tɕɛ
3	ss	ɔ̃	

- ɛ by itself doesn't palatalize, e.g.
  sɛns-ɛm / *ɕɛnɕ-ɛm 'sense-INST'

Class I/type 2: palatalization

(3)

	2a		
1sg	ss	ɛ̃	
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1pl	sɕ	ɛ	mɨ
2	sɕ	ɛ	tɕɛ
3	ss	ɔ̃	

- ɛ by itself doesn't palatalize, e.g.
  sɛns-ɛm / *ɕɛnɕ-ɛm 'sense-INST'

Class I/type 2: PAL as a morpheme

(3)

	2a			
1sg	ss		ɛ̃	
2	ss	PAL	ɛ	š
3	ss	PAL	ɛ	
1pl	ss	PAL	ɛ	mɨ
2	ss	PAL	ɛ	tɕɛ
3	ss		ɔ̃	

- coronal palatalization:
  s, z, t, d, n → ɕ, ʑ, tɕ, dʑ, ȵ

Class I/type 2: PAL as a morpheme

(3)

	2a			
1sg	ss		ɛ̃	
2	ss	PAL	ɛ	š
3	ss	PAL	ɛ	
1pl	ss	PAL	ɛ	mɨ
2	ss	PAL	ɛ	tɕɛ
3	ss		ɔ̃	

- coronal palatalization:
  s, z, t, d, n → ɕ, ʑ, tɕ, dʑ, ɲ

Class I/type 2: PAL as a morpheme

(4)

	2a				**2b**			
1sg	ss		ɛ̃		piš		ɛ̃	
2	ss	PAL	ɛ	š	piš	PAL	ɛ	š
3	ss	PAL	ɛ		piš	PAL	ɛ	
1pl	ss	PAL	ɛ	mɨ	piš	PAL	ɛ	mɨ
2	ss	PAL	ɛ	tɕɛ	piš	PAL	ɛ	tɕɛ
3	ss		ɔ̃		piš		ɔ̃	

- coronal palatalization: s, z, t, d, n → ɕ, ʑ, tɕ, dʑ, ɲ
- non-coronals: unaffected by PAL

Class I/type 3: root suppletion

(5)

	3
1sg	bjɔr ɛ̃
2	bjɛž ɛ š
3	bjɛž ɛ
1pl	bjɛž ɛ mɨ
2	bjɛž ɛ tɕɛ
3	bjɔr ɔ̃

Class I roots and suffixes

(6)

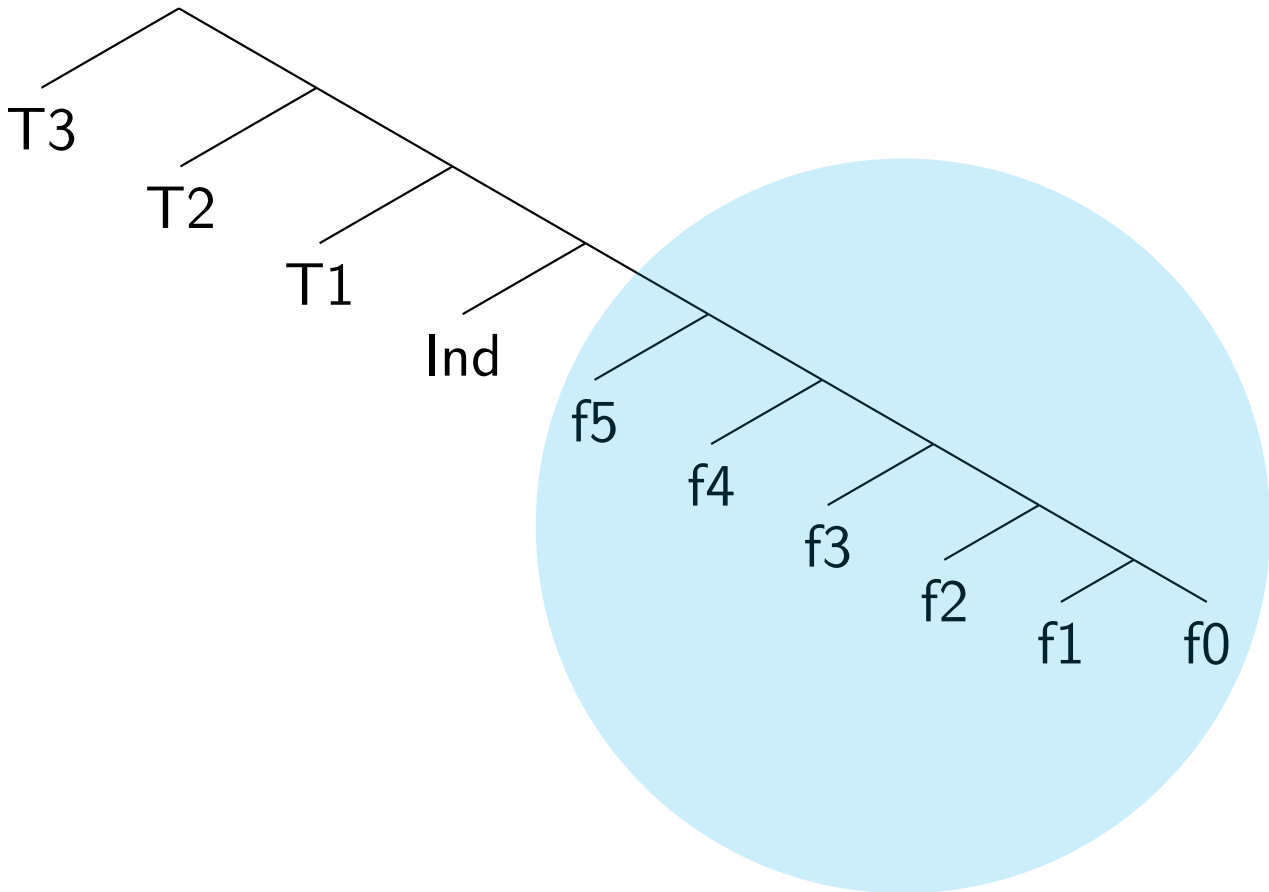
	1	**2**	**3**
1sg	dɔsta j ɛ̃	ss ɛ̃	bjɔr ɛ̃
2	dɔsta j ɛ š	ss PAL ɛ š	bjɛž ɛ š
3	dɔsta j ɛ	ss PAL ɛ	bjɛž ɛ
1pl	dɔsta j ɛ mɨ	ss PAL ɛ mɨ	bjɛž ɛ mɨ
2	dɔsta j ɛ tɕɛ	ss PAL ɛ tɕɛ	bjɛž ɛ tɕɛ
3	dɔsta j ɔ̃	ss ɔ̃	bjɔr ɔ̃

- **Asymmetry**

  1sg/3pl vs. other forms: least complex and with root suppletion

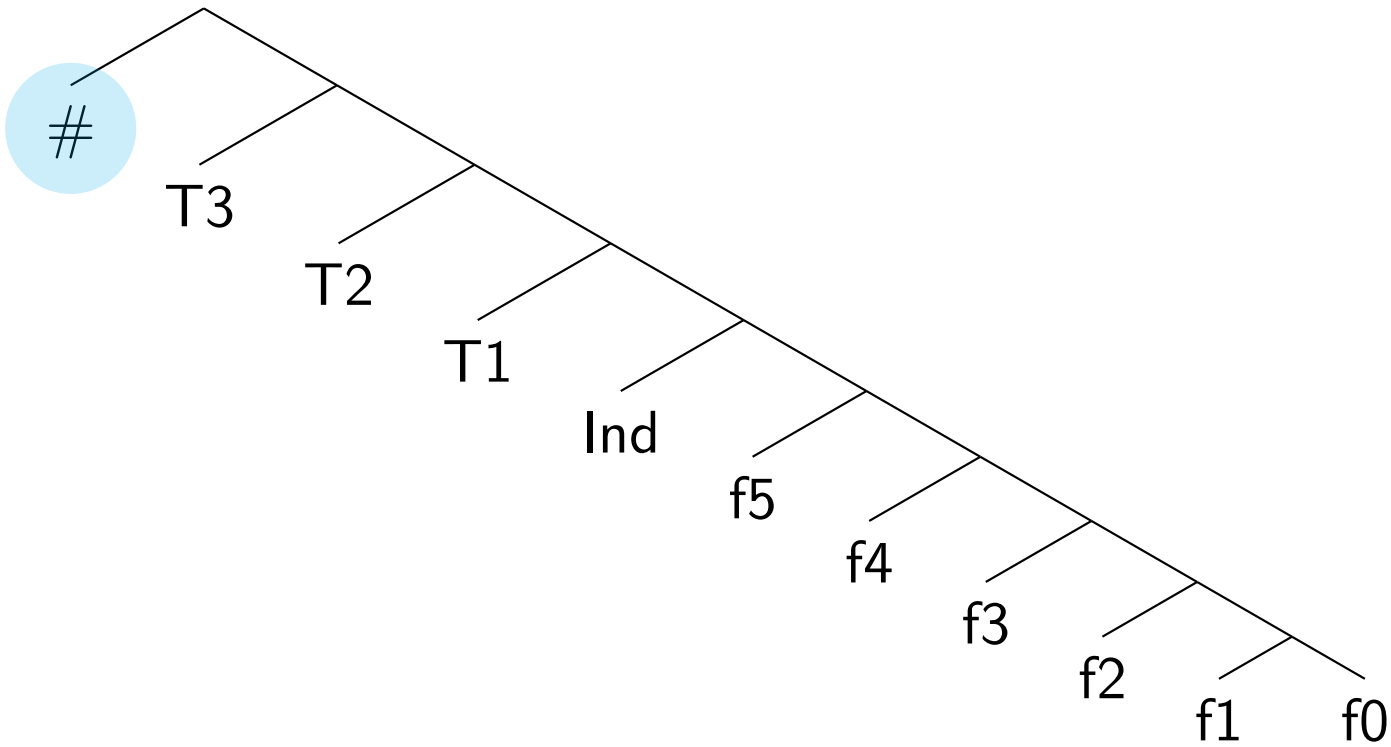
Analysis ingredient #1: (simplified) present tense fseq

(7)



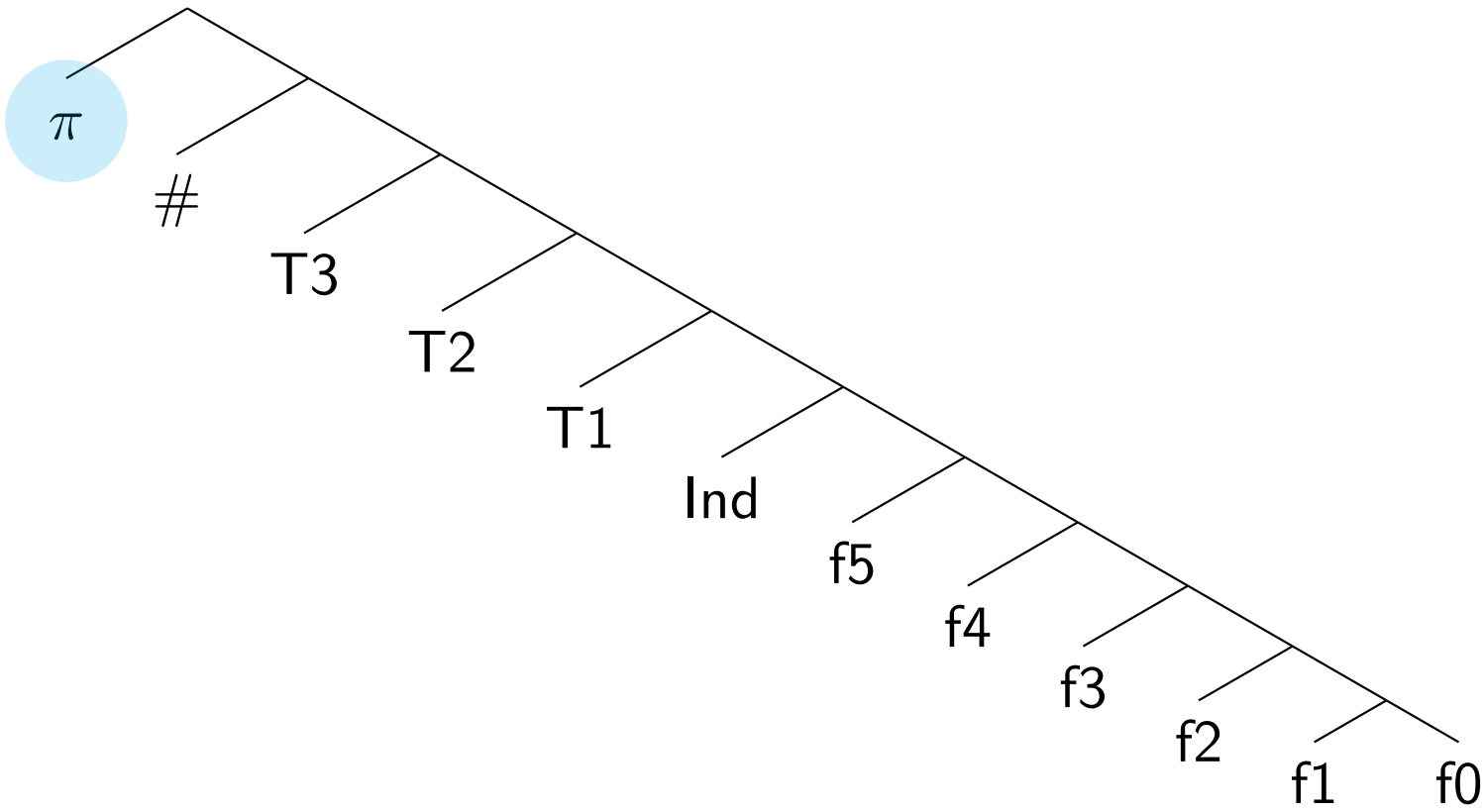
Number: singular

(8)



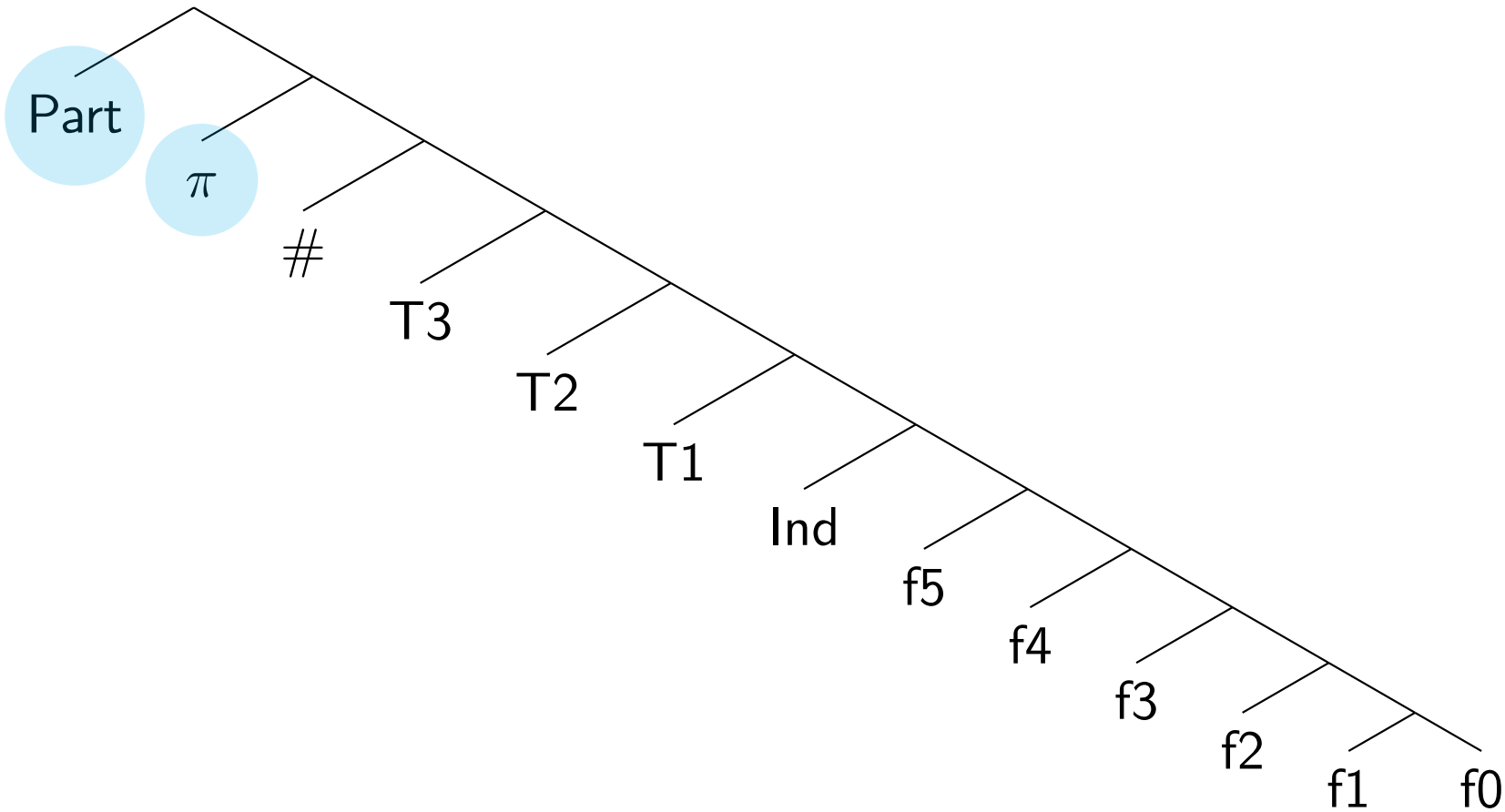
Persons: 3rd

(9)



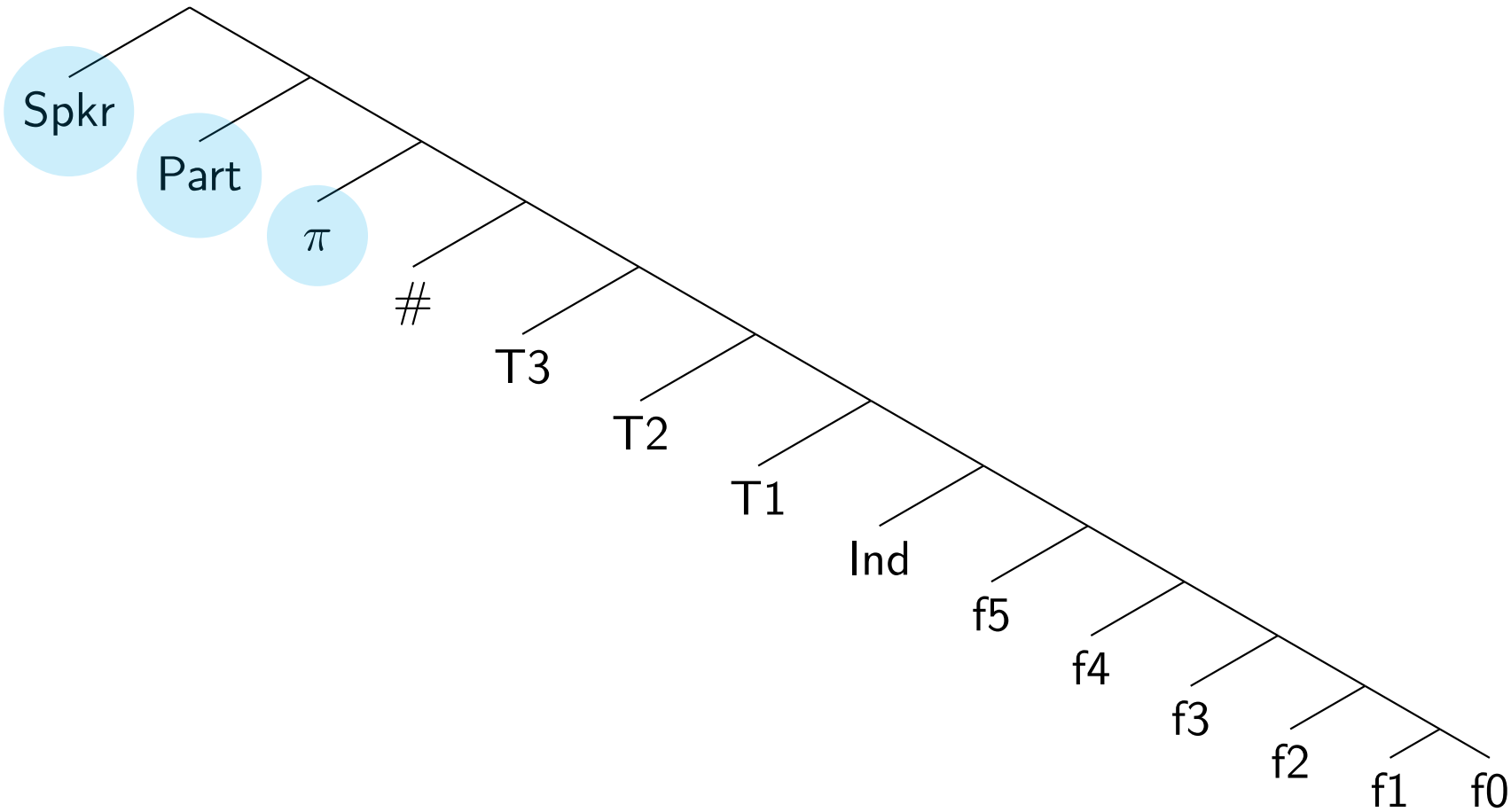
Persons: 2nd

(10)



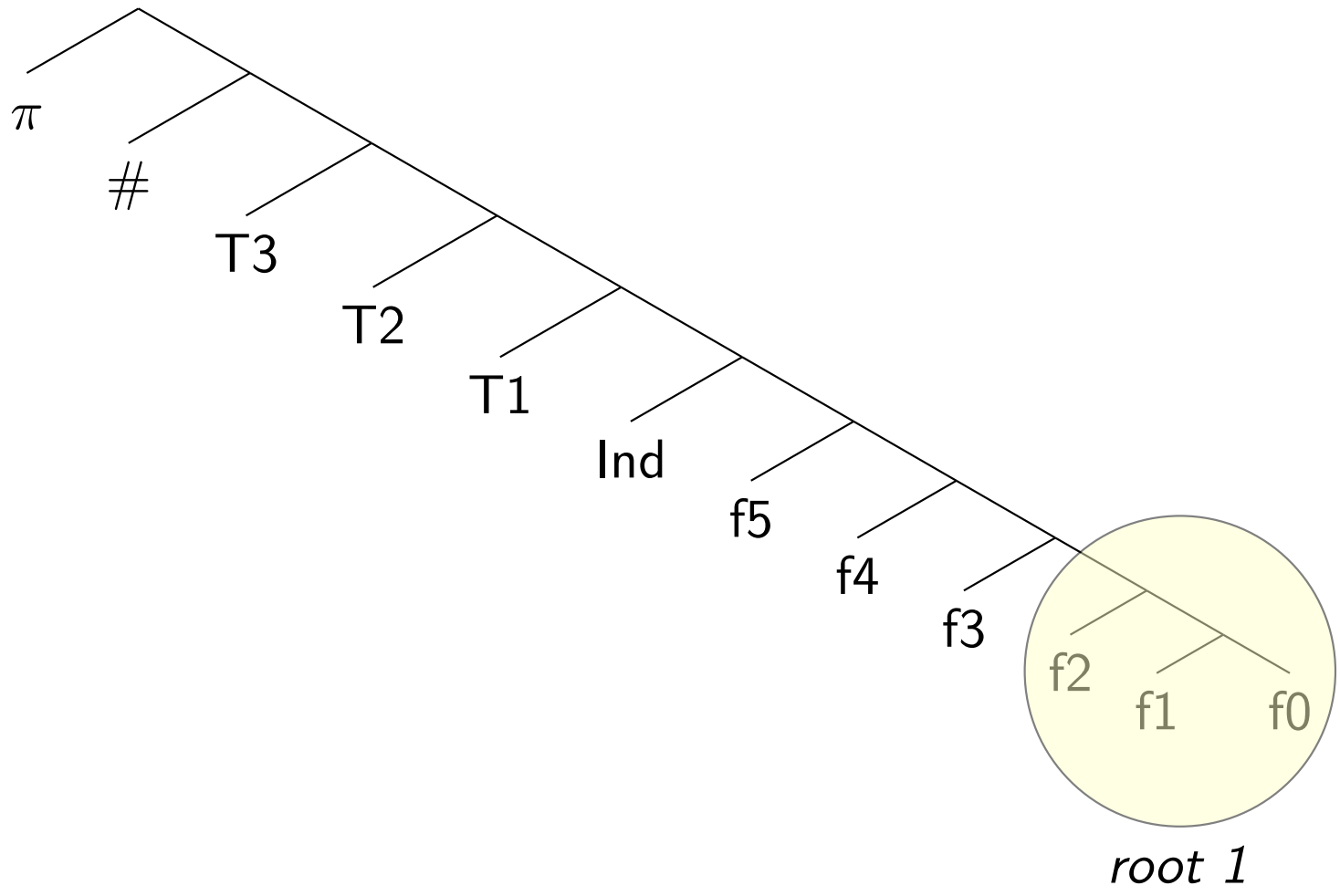
Persons: 1st

(11)



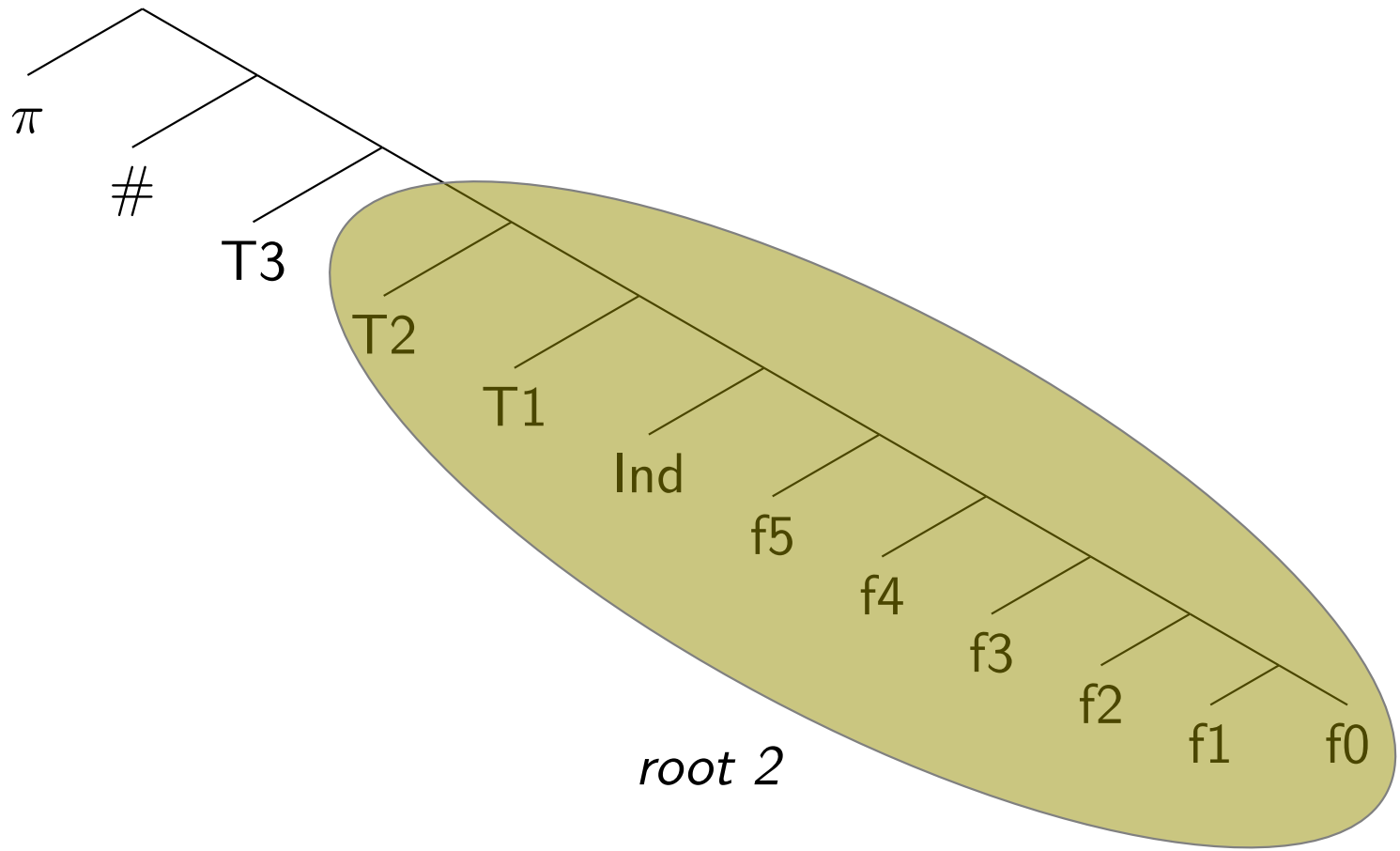
Ingredient #2: root sizes

(12)



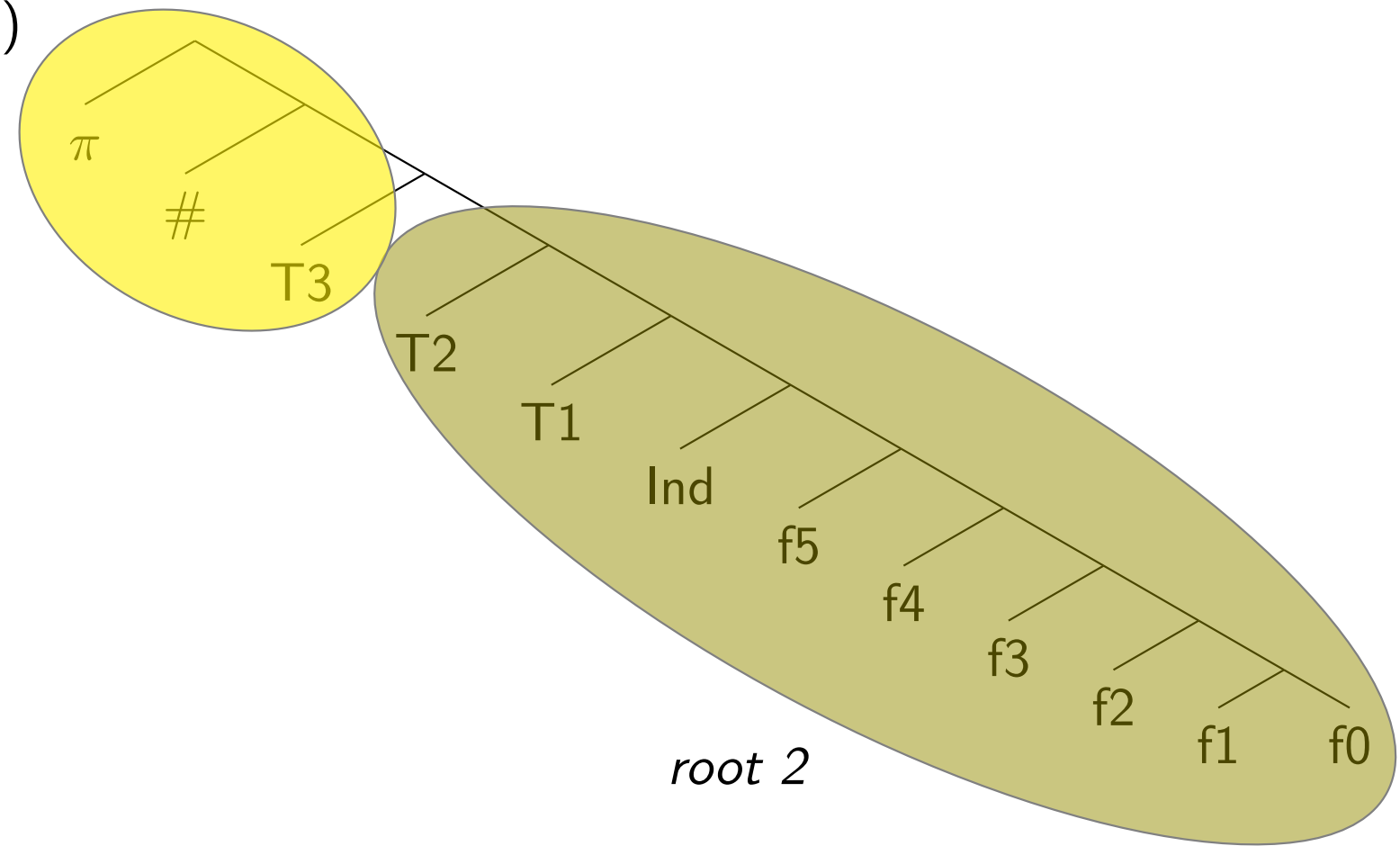
Ingredient #2: root sizes

(13)



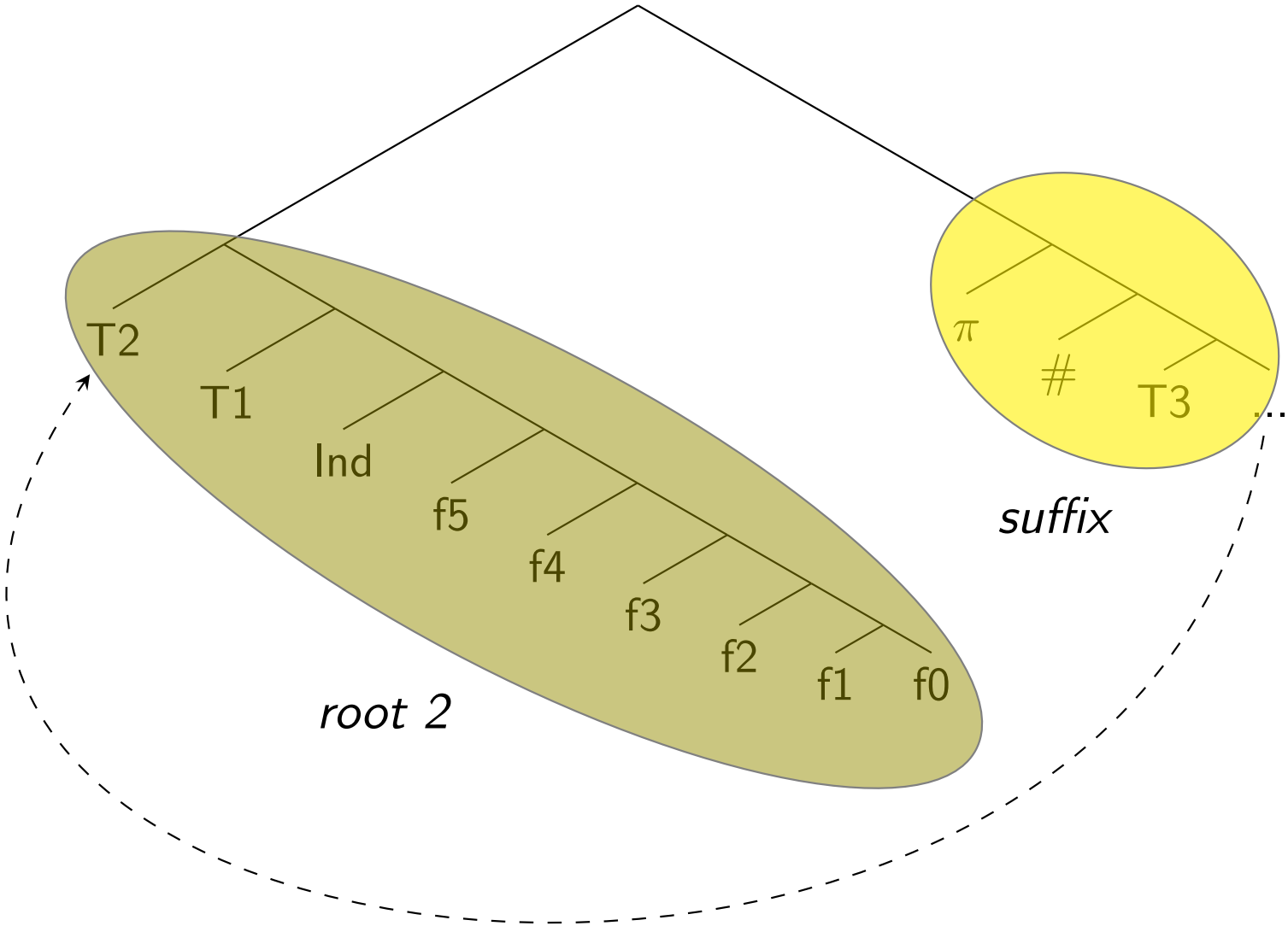
Root sizes and affixes

(14)



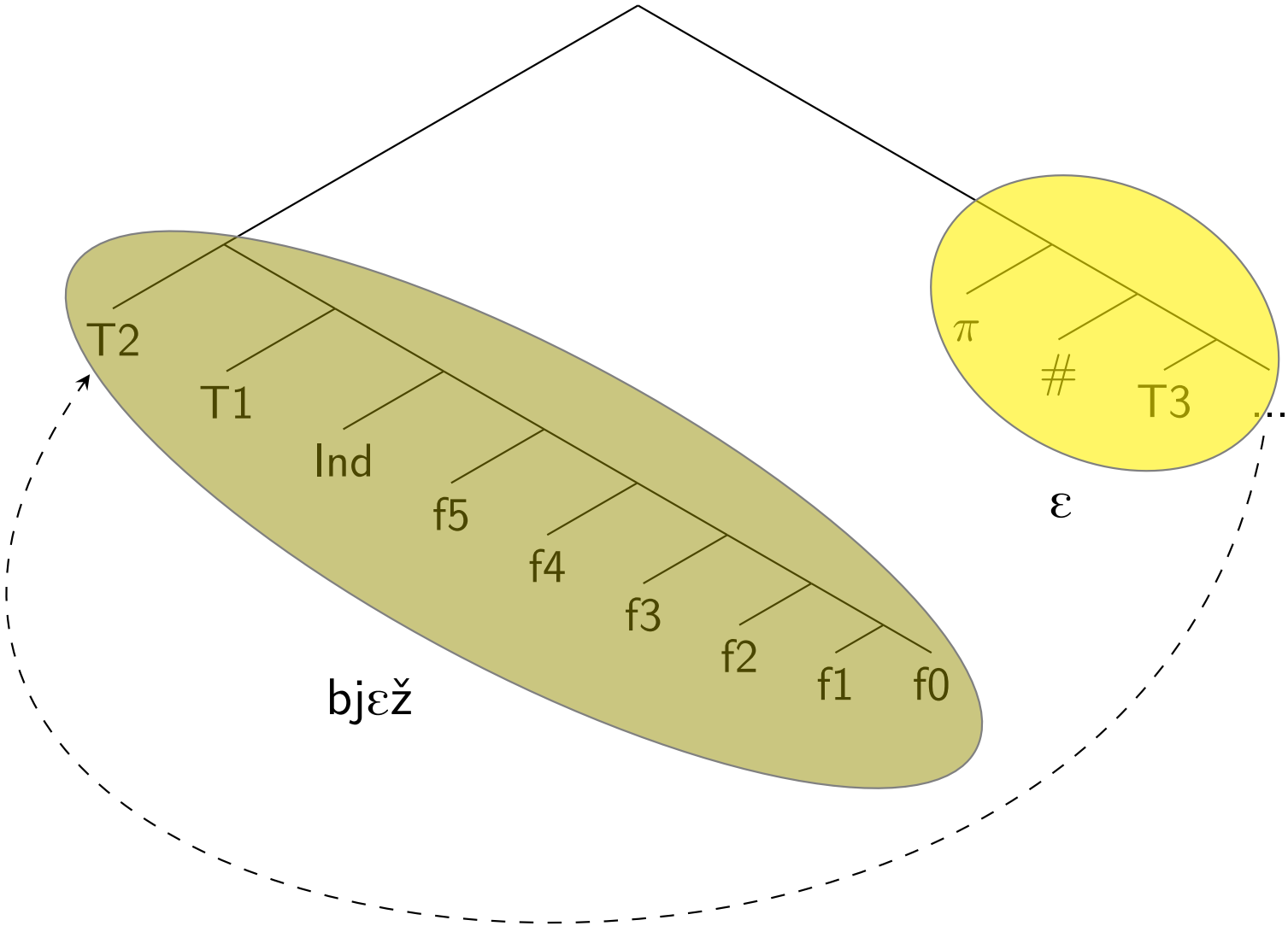
Lexicalization

(15)



3sg: class I/type 3

(16)



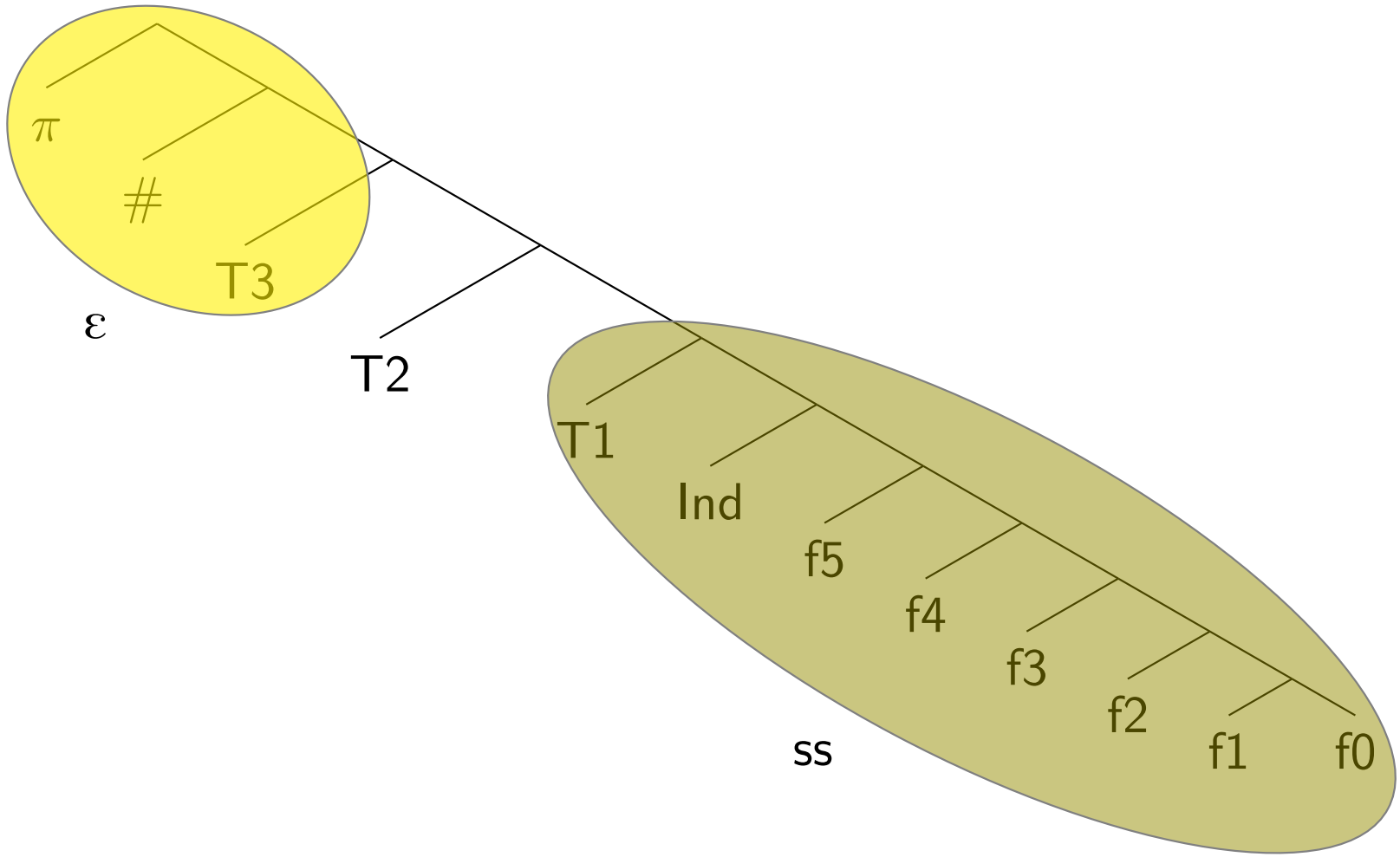
3sg: class I/type 3 – lexicalization table

(17)

		f0	f1	f2	f3	f4	f5	Ind	T1	T2	T3	#	π
3sg	**I/3**	bjɛž									ɛ		

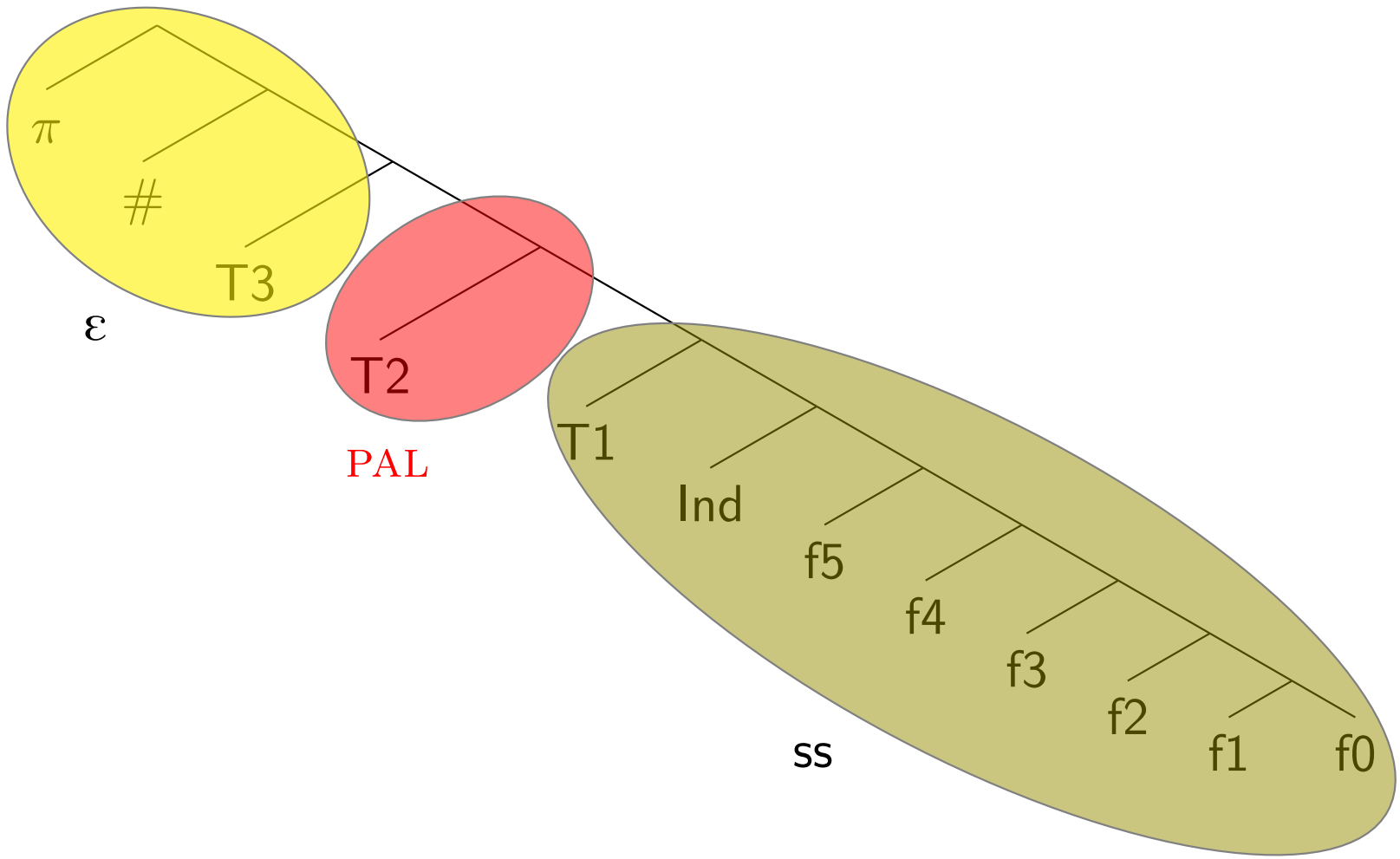
3sg: class I/type 2

(18)



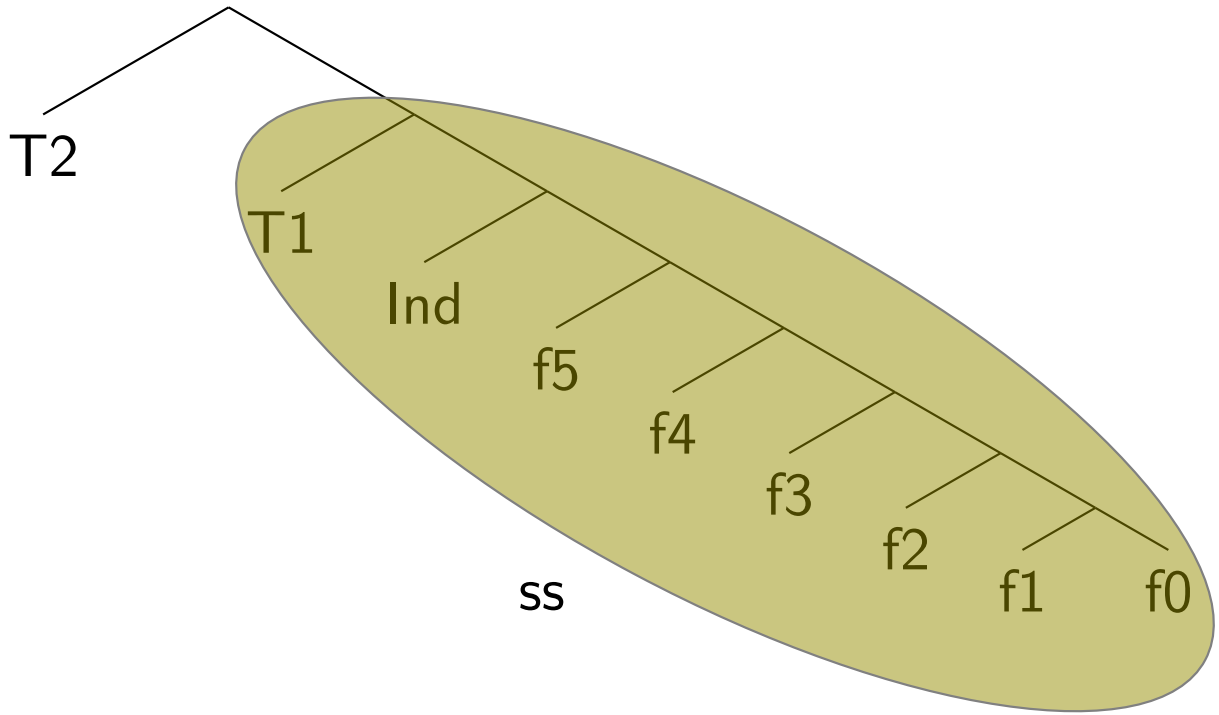
3sg: class I/type 2

(19)



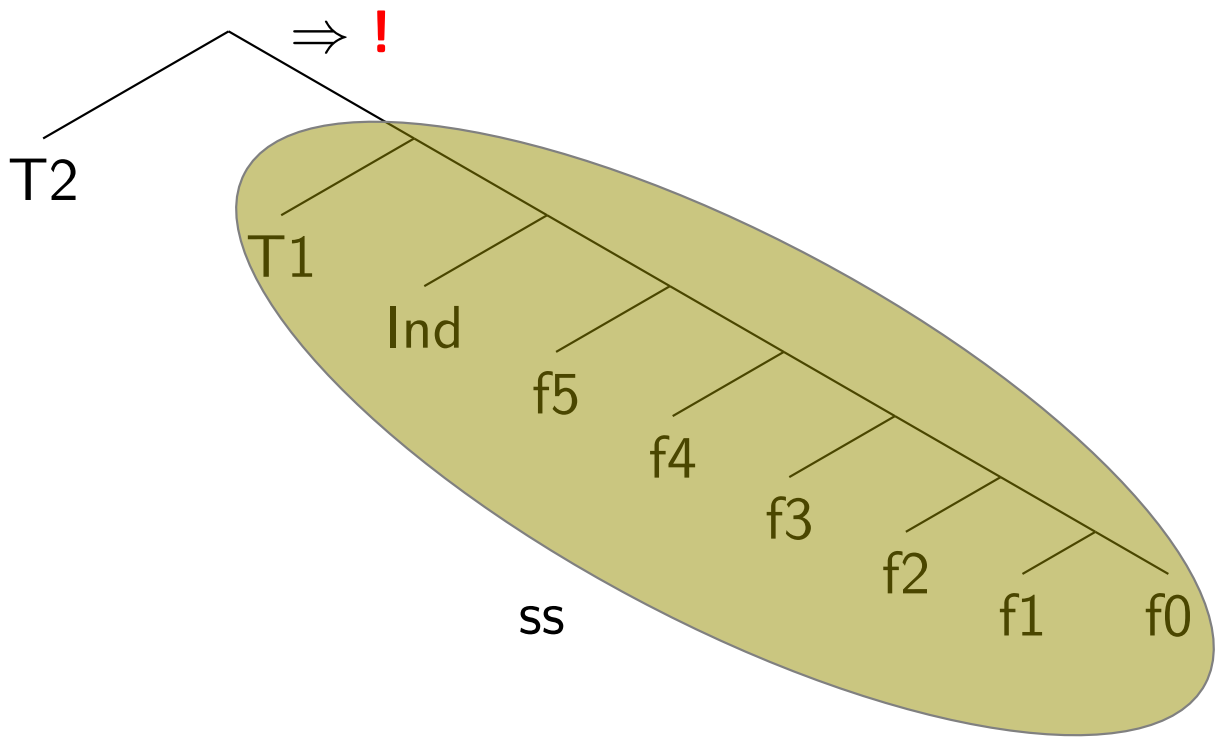
3sg: class I/type 2 – lexicalization

(20)



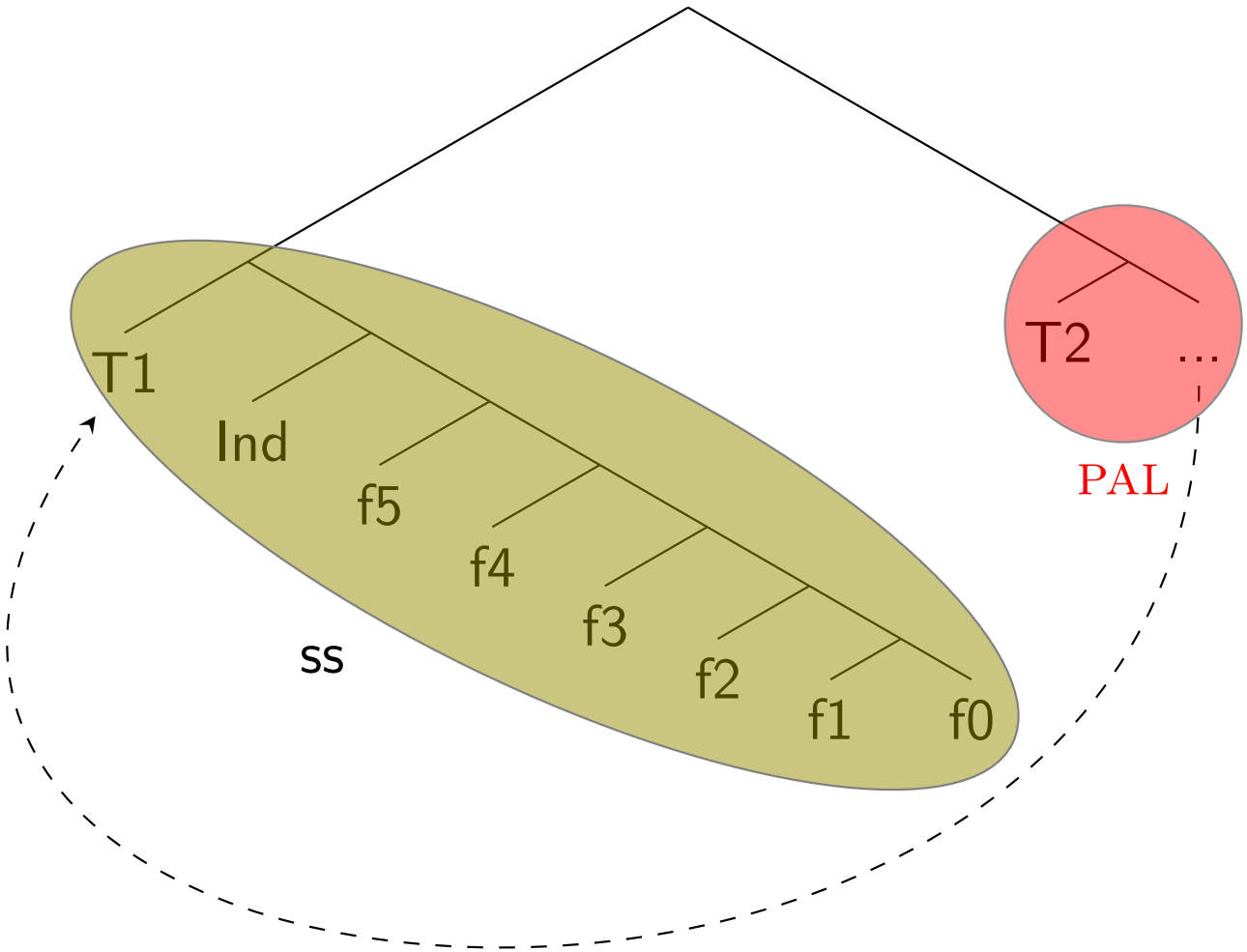
step 1: merge f and lexicalize fP

(21)



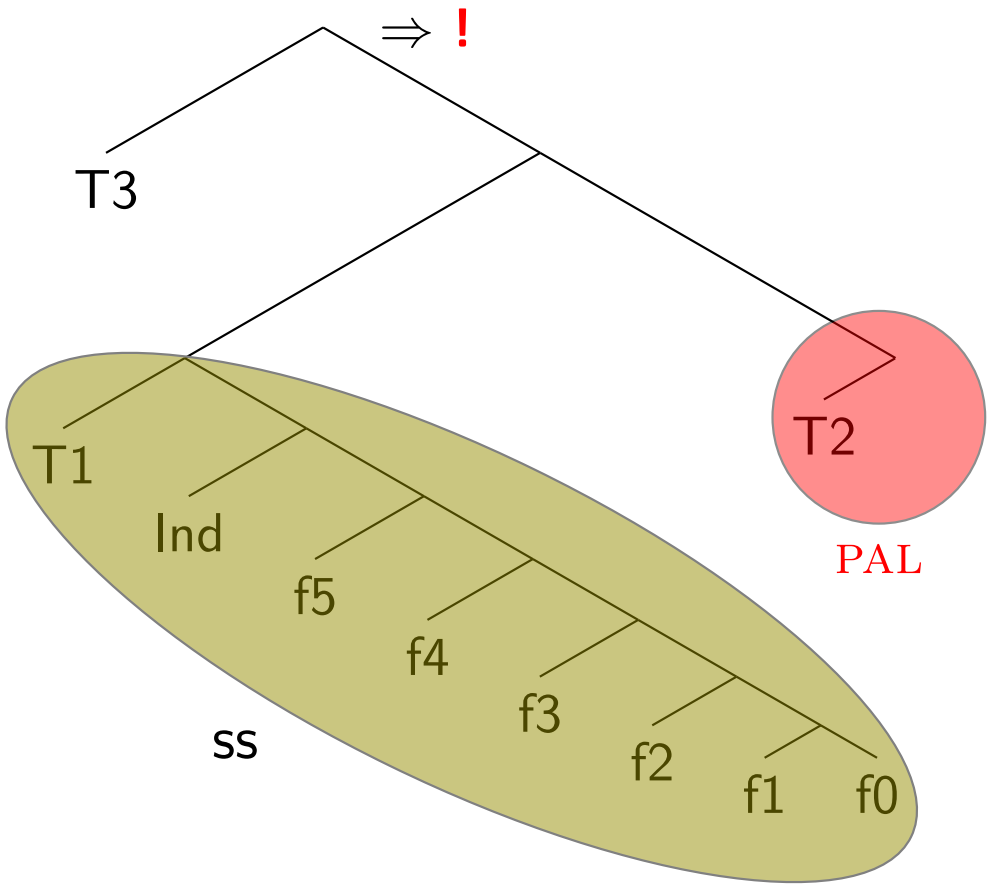
step 2: evacuate the closest non-remnant constituent and lexicalize fP

(22)



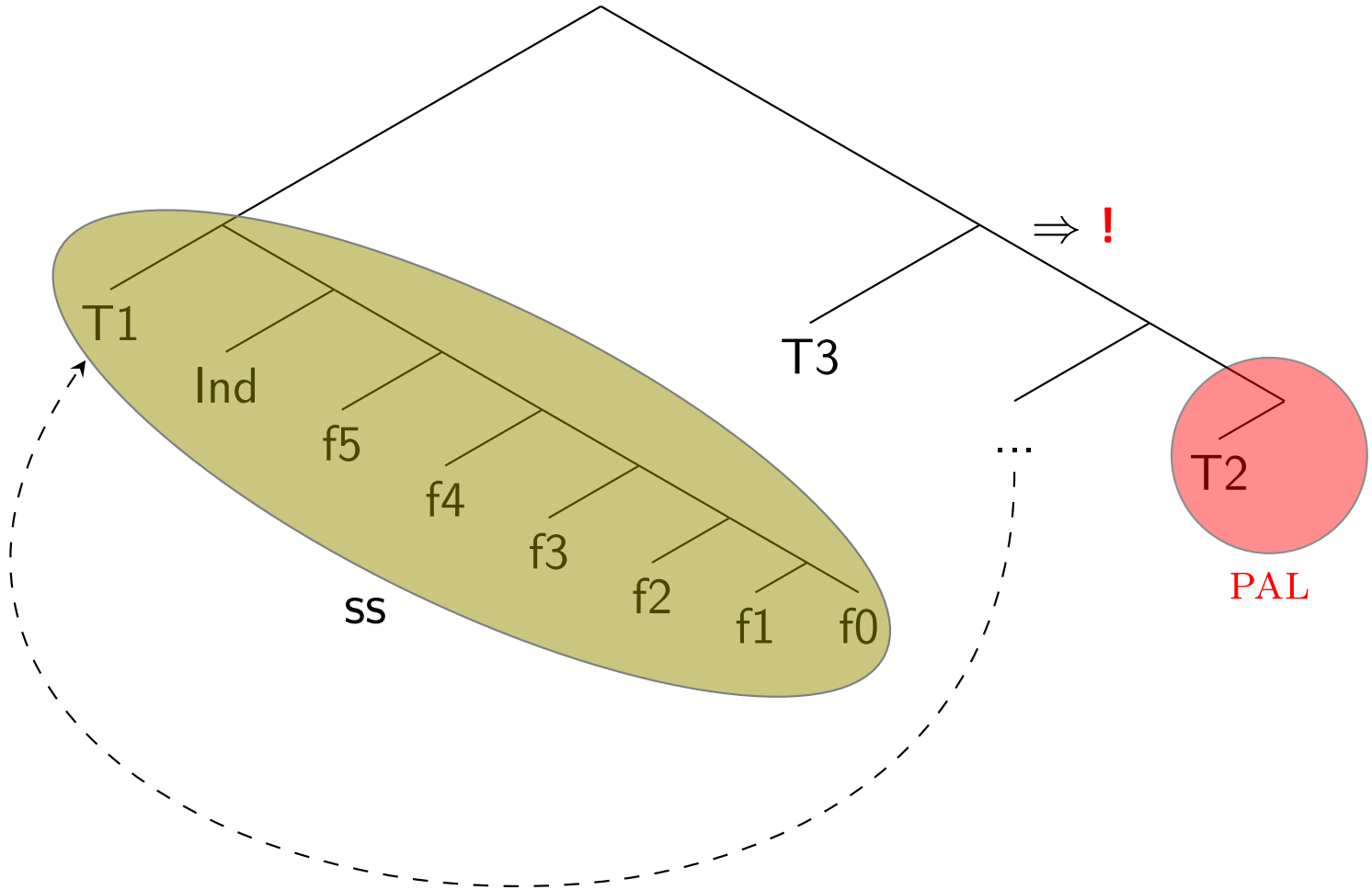
step 1: merge f and lexicalize fP

(23)



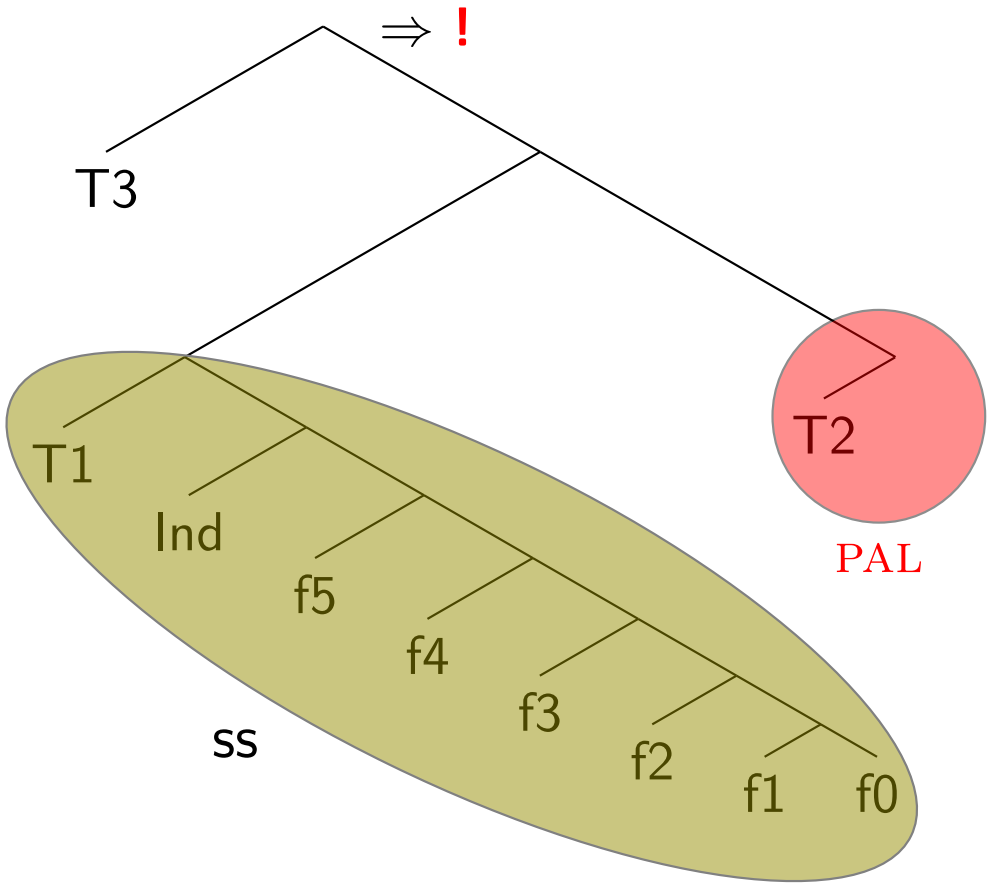
step 2: evacuate the closest non-remnant constituent and lexicalize fP

(24)



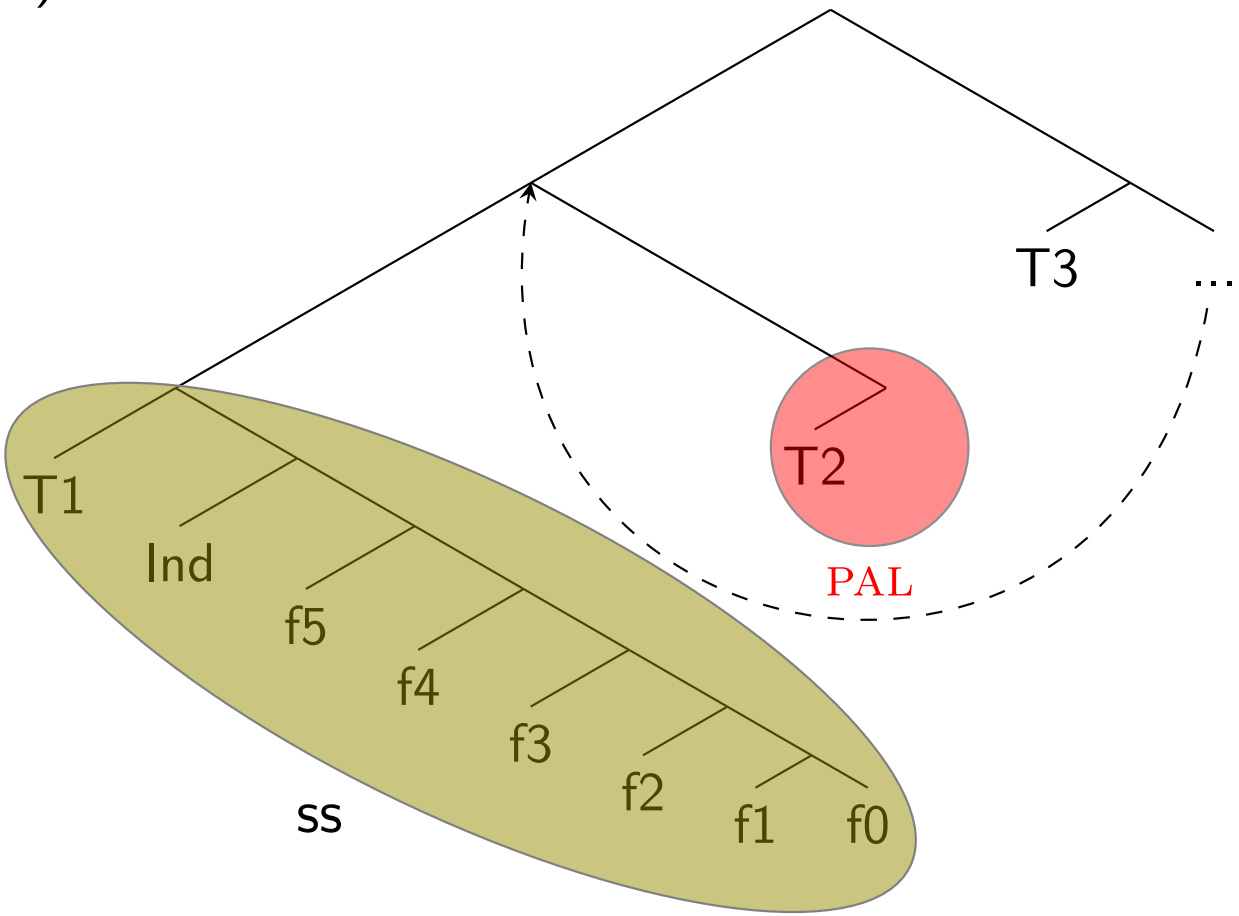
backtrack

(25)



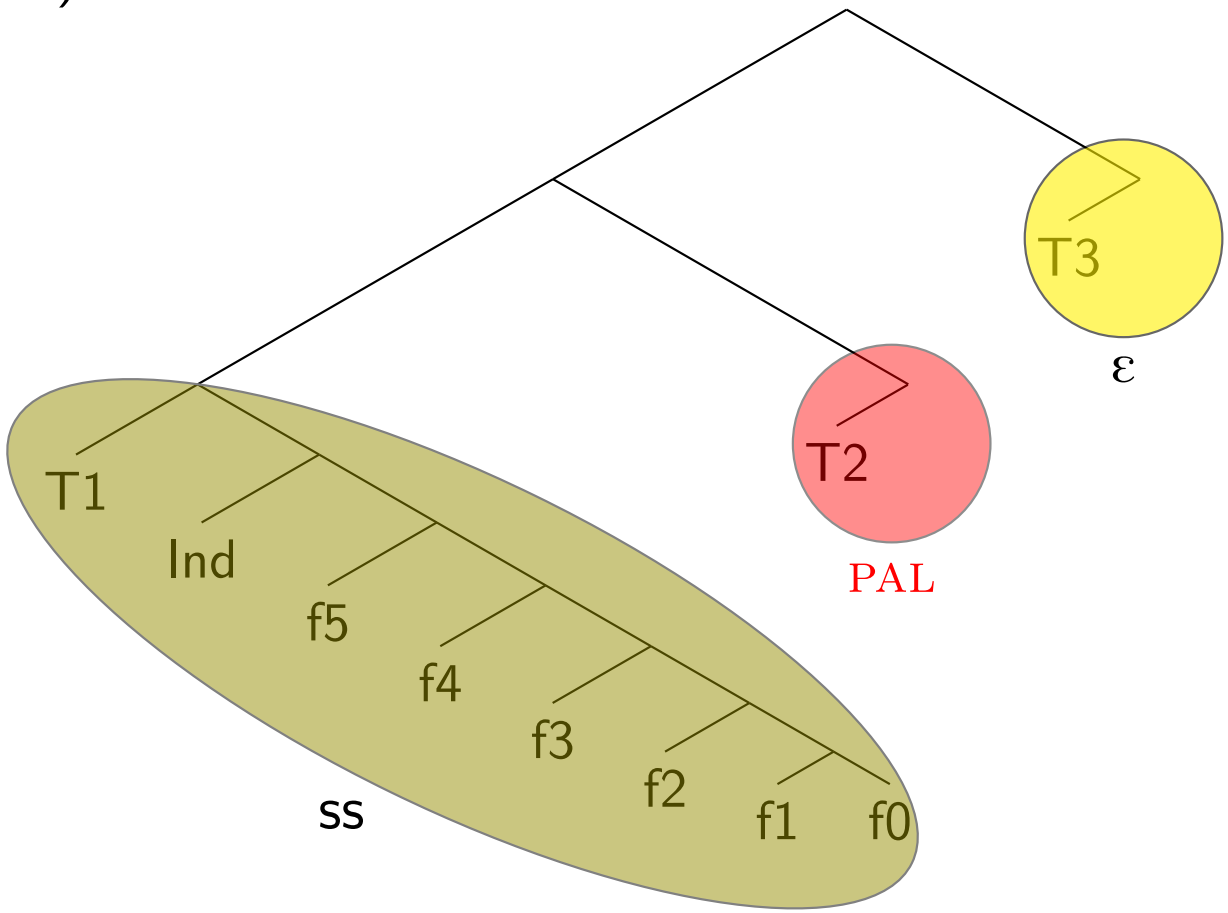
step 3: evacuate the immediately dominating node and lexicalize fP

(26)



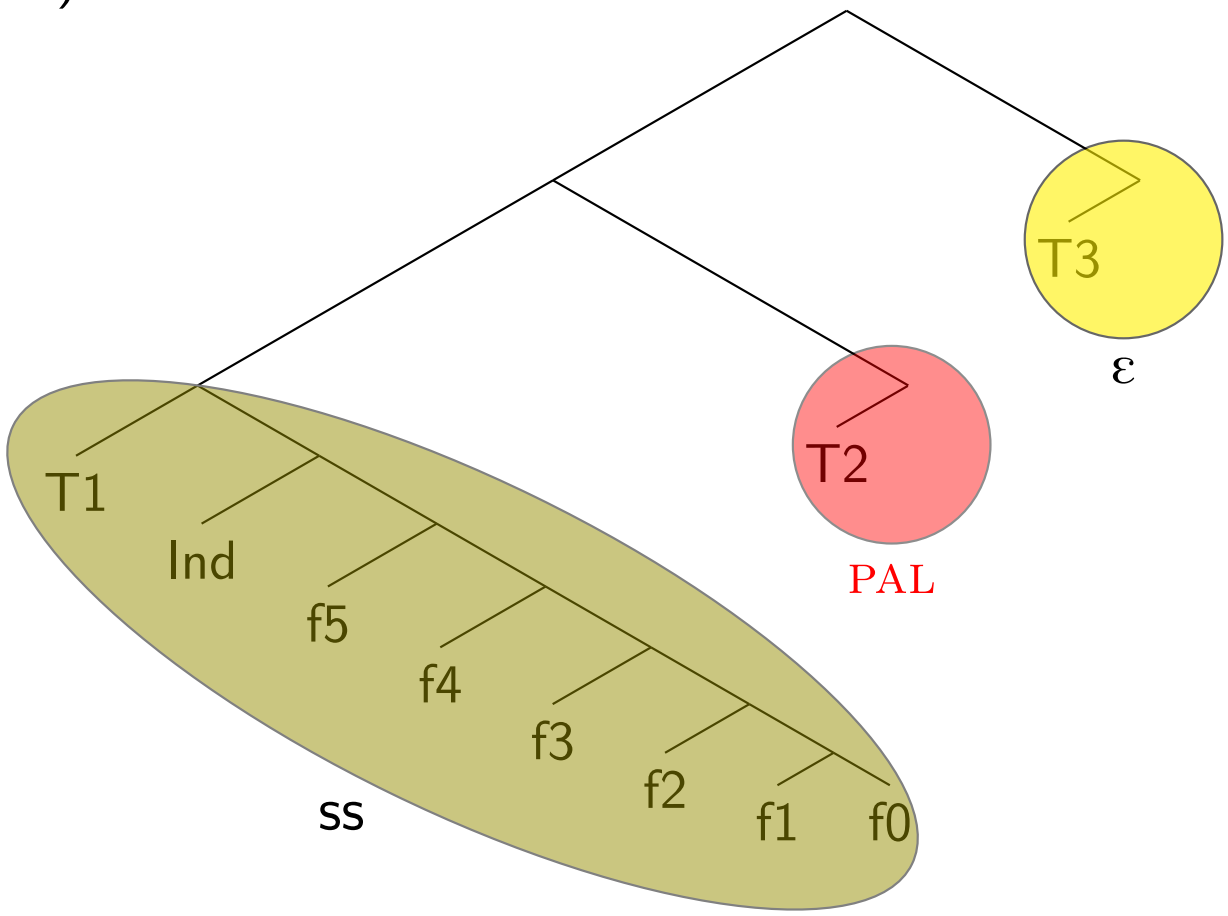
step 3: evacuate the immediately dominating node and lexicalize fP

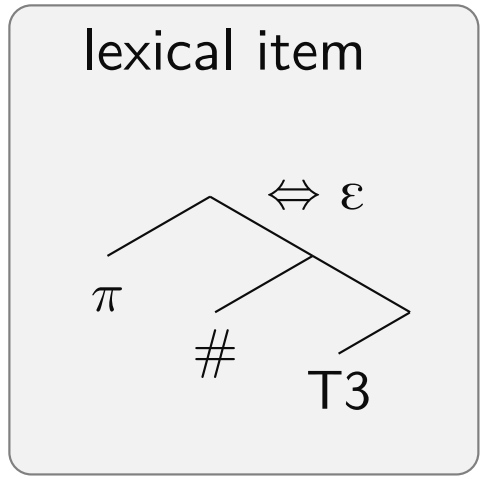
(27)



ε as a subset spellout

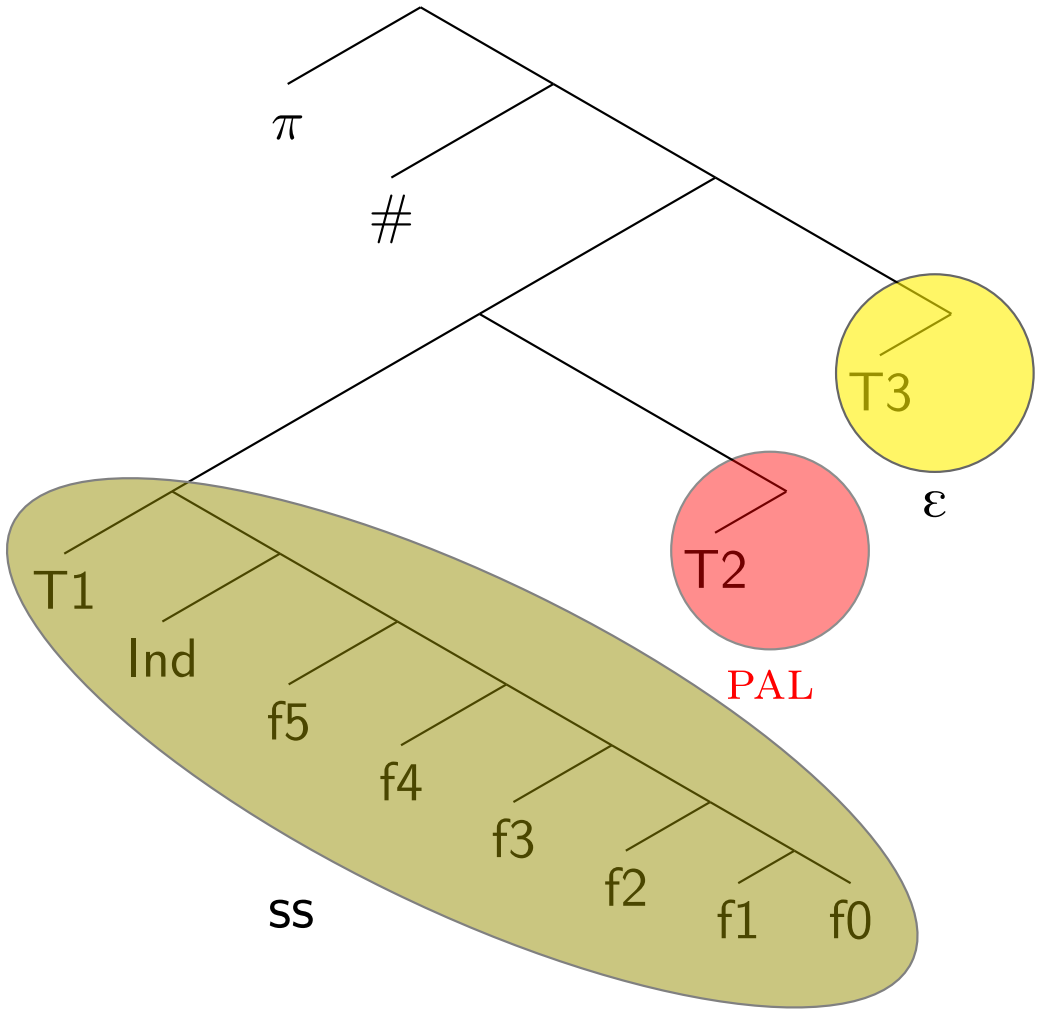
(27)





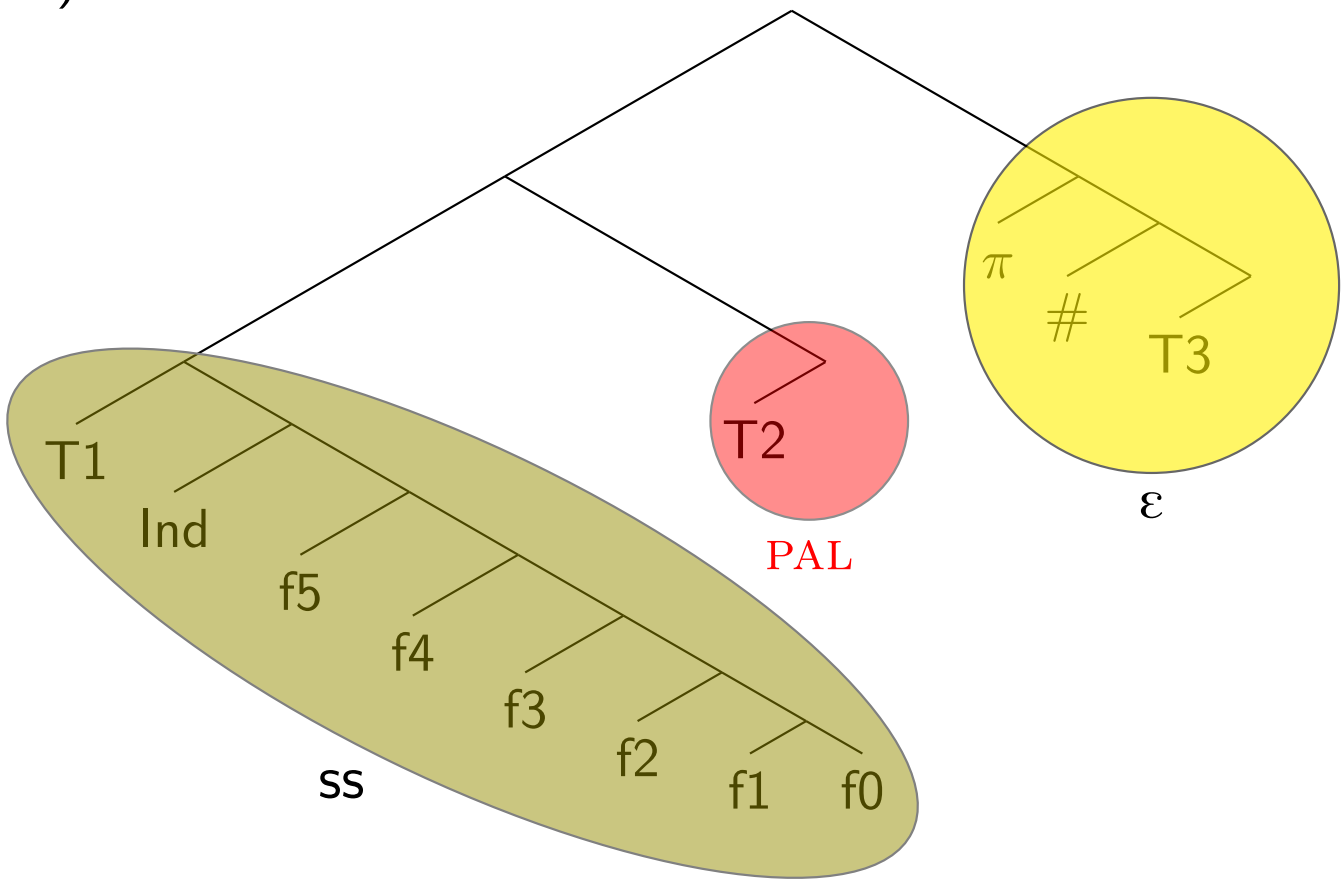
adding # and π

(28)



ε as a superset spellout after lexicalizing # and π

(29)

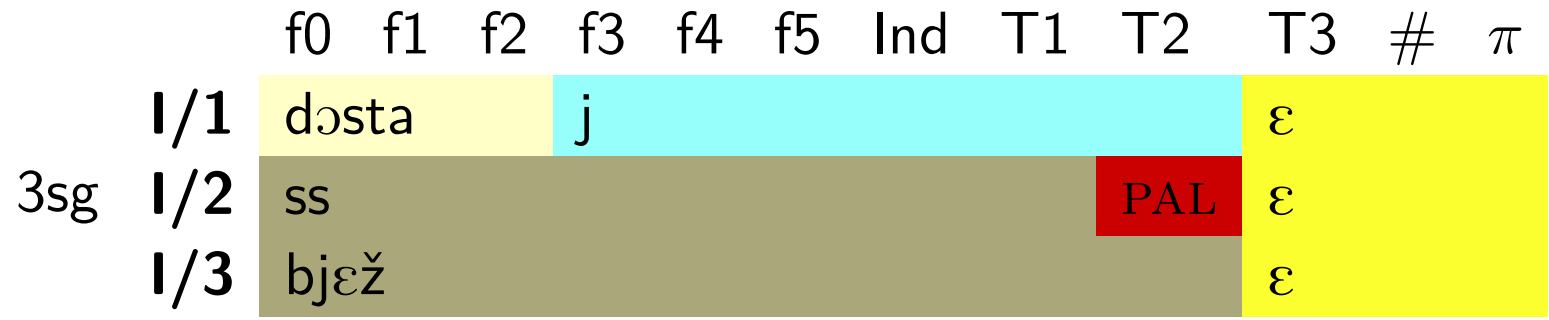


3sg: class I/type 2 vs. 3

(30)

3sg: class I/type 1 vs. 2 vs. 3

(31)



2sg: adding Part

(32)

		f0	f1	f2	f3	f4	f5	Ind	T1	T2	T3	#	π	**Part**
I/1	2sg	dɔsta			j						ɛ			
	3sg	dɔsta			j						ɛ			

2sg: no LI starts in Part

(33)

		f0	f1	f2	f3	f4	f5	Ind	T1	T2	T3	#	π	**Part**
I/1	2sg	dɔsta			j						ɛ			!
	3sg	dɔsta			j						ɛ			

2sg: backtrack one cycle and try a different LI

(34)

		f0	f1	f2	f3	f4	f5	Ind	T1	T2	T3	#	π	**Part**
I/1	2sg	dɔsta			j						ɛ		š	
	3sg	dɔsta			j						ɛ			

2sg & 3sg in class I

(35)

		f0	f1	f2	f3	f4	f5	Ind	T1	T2	T3	#	π	**Part**
I/1	2sg	dɔsta			j						ɛ		š	
	3sg	dɔsta			j						ɛ			
I/2	2sg	ss								PAL	ɛ		š	
	3sg	ss								PAL	ɛ			
I/3	2sg	bjɛž									ɛ		š	
	3sg	bjɛž									ɛ			

Recall simpler-looking 1sg

(36)

	1	**2**	**3**
1sg	dɔsta j ɛ̃	ss ɛ̃	bjɔr ɛ̃
2	dɔsta j ɛ š	ss PAL ɛ š	bjɛž ɛ š
3	dɔsta j ɛ	ss PAL ɛ	bjɛž ɛ

adding Spkr

(37)

		f0	f1	f2	f3	f4	f5	Ind	T1	T2	T3	#	π	Part	**Spkr**
	1sg	dɔsta			j						ɛ		š		
I/1	2	dɔsta			j						ɛ		š		
	3	dɔsta			j						ɛ				

no LI starts in Spkr

(38)

		f0	f1	f2	f3	f4	f5	Ind	T1	T2	T3	#	π	Part	**Spkr**
	1sg	dɔsta			j						ɛ		š		!
I/1	2	dɔsta			j						ɛ		š		
	3	dɔsta			j						ɛ				

backtrack, backtrack, ...

(39)

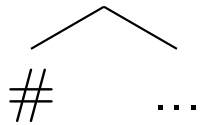
		f0	f1	f2	f3	f4	f5	Ind	T1	T2	T3	#	π	Part	**Spkr**
	1sg	dɔsta			j			ɛ̃							
I/1	2	dɔsta			j						ɛ		š		
	3	dɔsta			j						ɛ				

1sg: ‘disappearing’ PAL and root suppletion

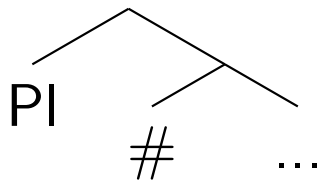
(40)

		f0	f1	f2	f3	f4	f5	Ind	T1	T2	T3	#	π	Part	**Spkr**
	1sg	dɔsta			j			ɛ̃							
I/1	2	dɔsta			j						ɛ		š		
	3	dɔsta			j						ɛ				
	1sg	ss						ɛ̃							
I/2	2	ss								PAL	ɛ		š		
	3	ss								PAL	ɛ				
	1sg	bjɔr						ɛ̃							
I/3	2	bjɛž									ɛ		š		
	3	bjɛž									ɛ				

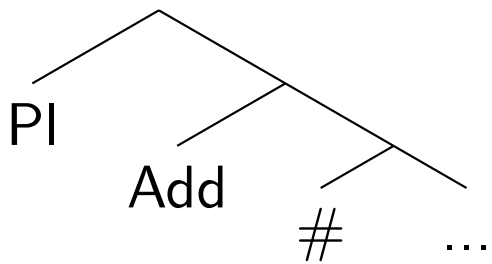
Number features

(41) 

singular (x)

(42) 

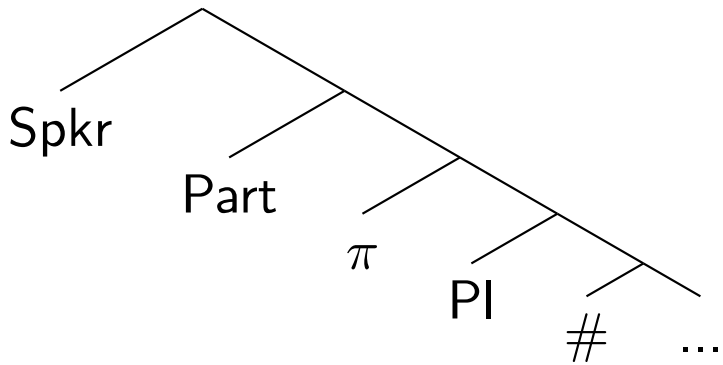
associative plural (x + *others*)

(43) 

additive plural ($x + x + x + \ldots$)

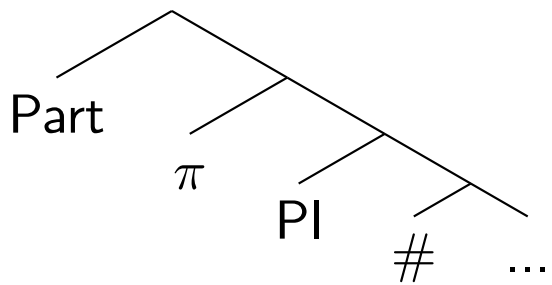
Plurals

(44)



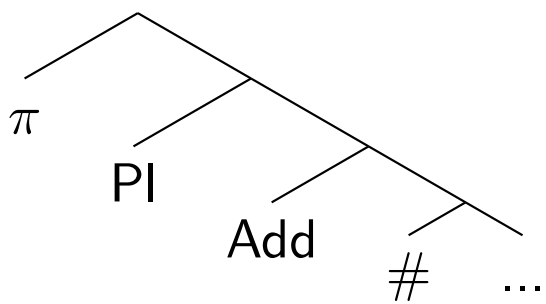
1pl (*I* + *others*)

(45)



2pl (*you* + *others*)

(46)



3pl (*people*)

Adding Pl

(47)

		f0	f1	f2	f3	f4	f5	Ind	T1	T2	T3	#	**Pl**	π	Part	Spkr
	1sg	dɔsta			j			ɛ̃								
	2	dɔsta			j						ɛ			š		
I/1	3	dɔsta			j						ɛ					
	1pl	dɔsta			j						ɛ		mɨ			
	2	dɔsta			j						ɛ		tɕɛ			

Adding ADD

(48)

		f0	f1	f2	f3	f4	f5	Ind	T1	T2	T3	#	**Add**	Pl	π	Part	Spkr
I/1	1sg	dɔsta			j			ɛ̃									
	2	dɔsta			j						ɛ				š		
	3	dɔsta			j						ɛ						
	1pl	dɔsta			j						ɛ			mɨ			
	2	dɔsta			j						ɛ			tɕɛ			
	3	dɔsta			j						ɛ			tɕɛ			

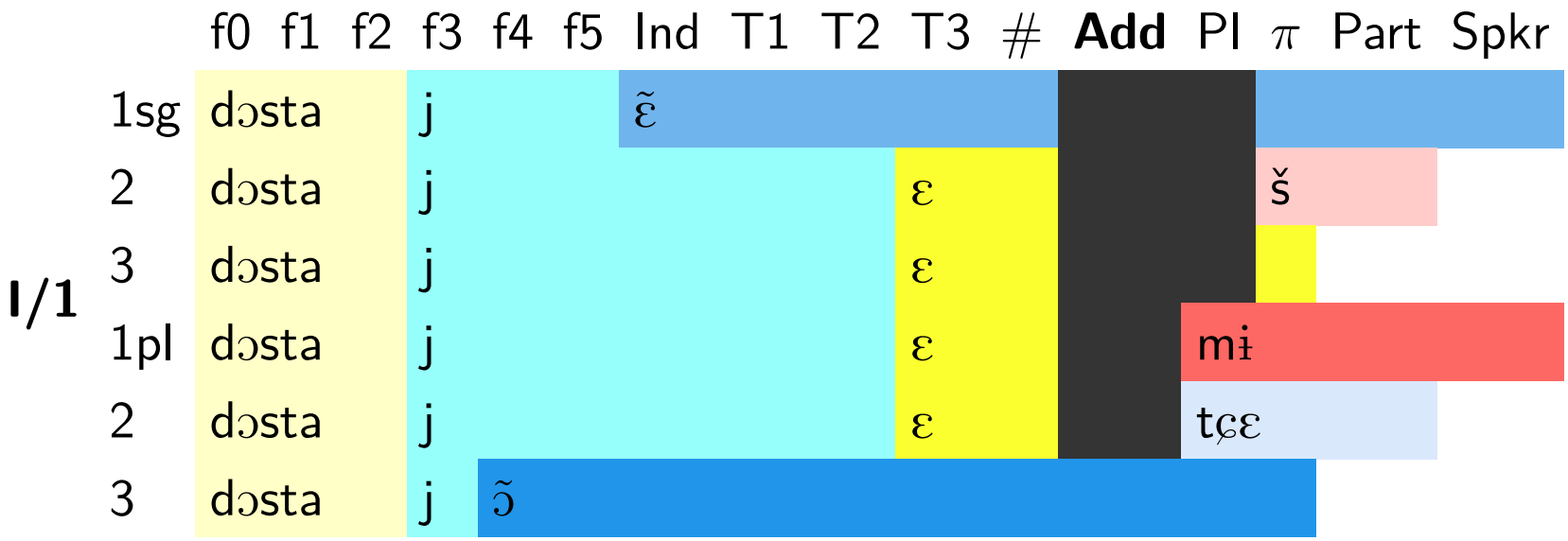
3pl: no LI starts in ADD

(49)

		f0	f1	f2	f3	f4	f5	Ind	T1	T2	T3	#	**Add**	Pl	π	Part	Spkr
I/1	1sg	dɔsta			j			ɛ̃									
	2	dɔsta			j						ɛ				š		
	3	dɔsta			j						ɛ						
	1pl	dɔsta			j						ɛ			mɨ			
	2	dɔsta			j						ɛ			tɕɛ			
	3	dɔsta			j						ɛ		?				

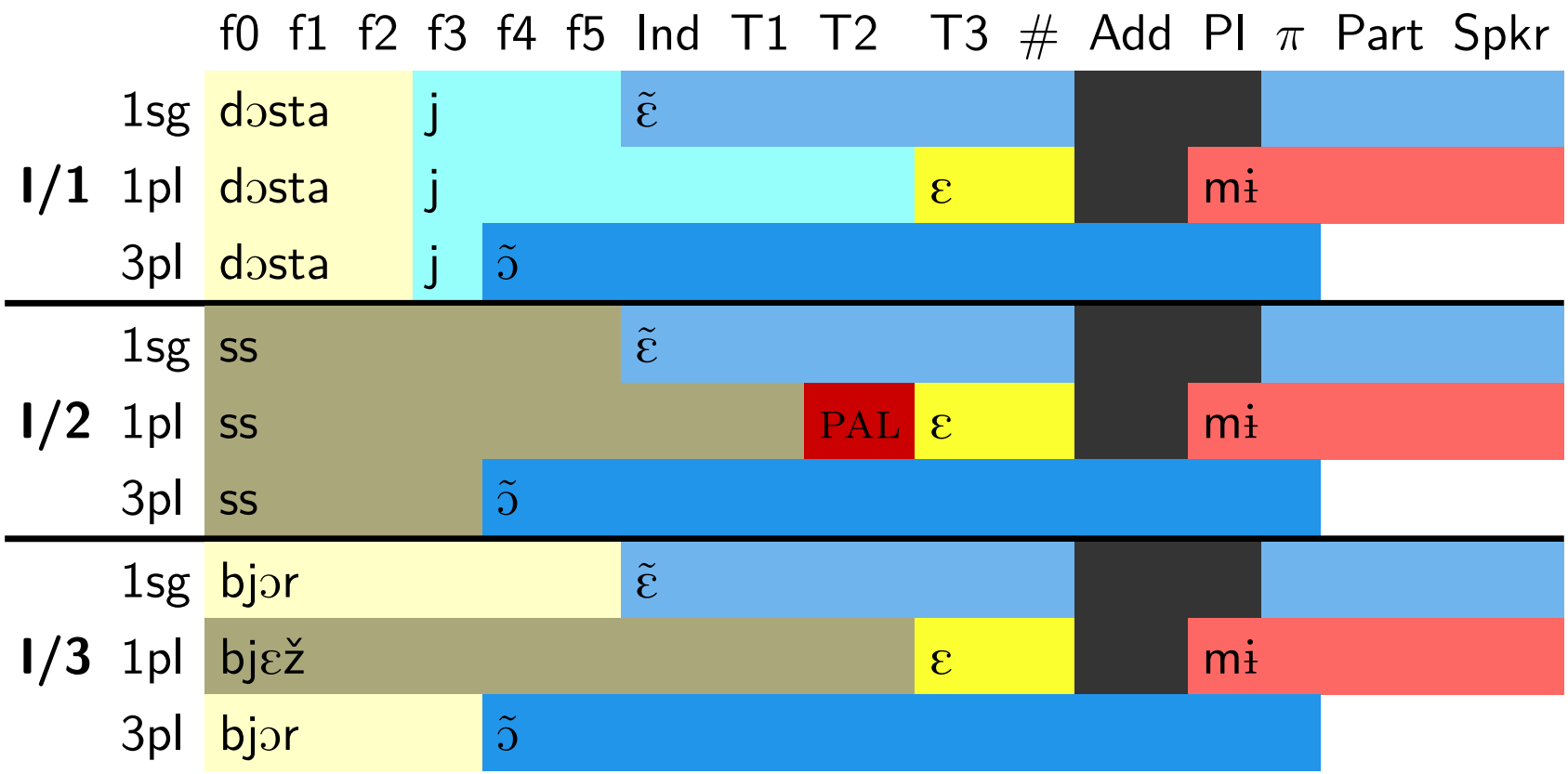
backtrack, backtrack, ...

(50)



1sg/3pl: ‘disappearing’ PAL and root suppletion

(51)



Class II

(52)	1sg	rɔbʲ	ɛ̃	
	2	rɔbʲ	i	š
	3	rɔbʲ	i	
	1pl	rɔbʲ	i	mɨ
	2	rɔbʲ	i	tɕɛ
	3	rɔbʲ	ɔ̃	

Class II

(53)

1sg	rɔbʲ	ɛ̃	
2	rɔbʲ	i	š
3	rɔbʲ	i	
1pl	rɔbʲ	i	mɨ
2	rɔbʲ	i	tɕɛ
3	rɔbʲ	ɔ̃	

- no palatalization before ɛ̃, ɔ̃, e.g.
  bɛ̃dɛ̃ / *bʲɛ̃dɛ̃
  bɔ̃k / *bʲɔ̃k

Class II: PAL as a morpheme

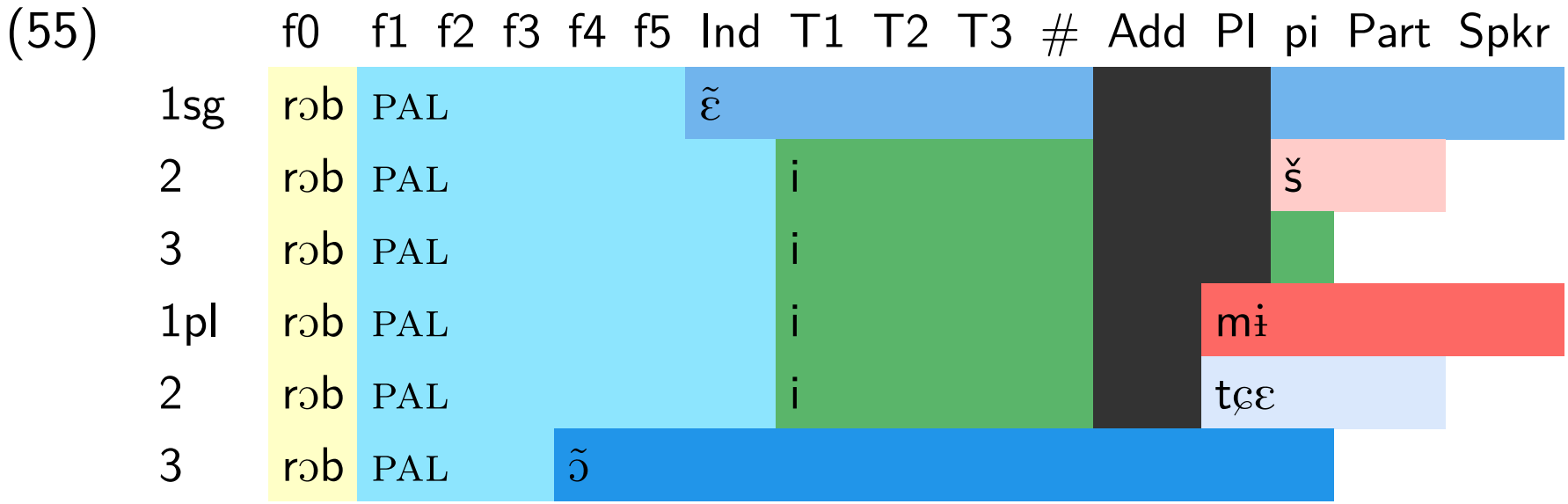
(54)

1sg	rɔb	PAL	ɛ̃	
2	rɔb	PAL	i	š
3	rɔb	PAL	i	
1pl	rɔb	PAL	i	mɨ
2	rɔb	PAL	i	tɕɛ
3	rɔb	PAL	ɔ̃	

- non-coronal palatalization:
  b, ts, m, n → b^j, tɕ, m^j, ɲ
  s, z, t, d → š, ž, ts, dz (iotation)

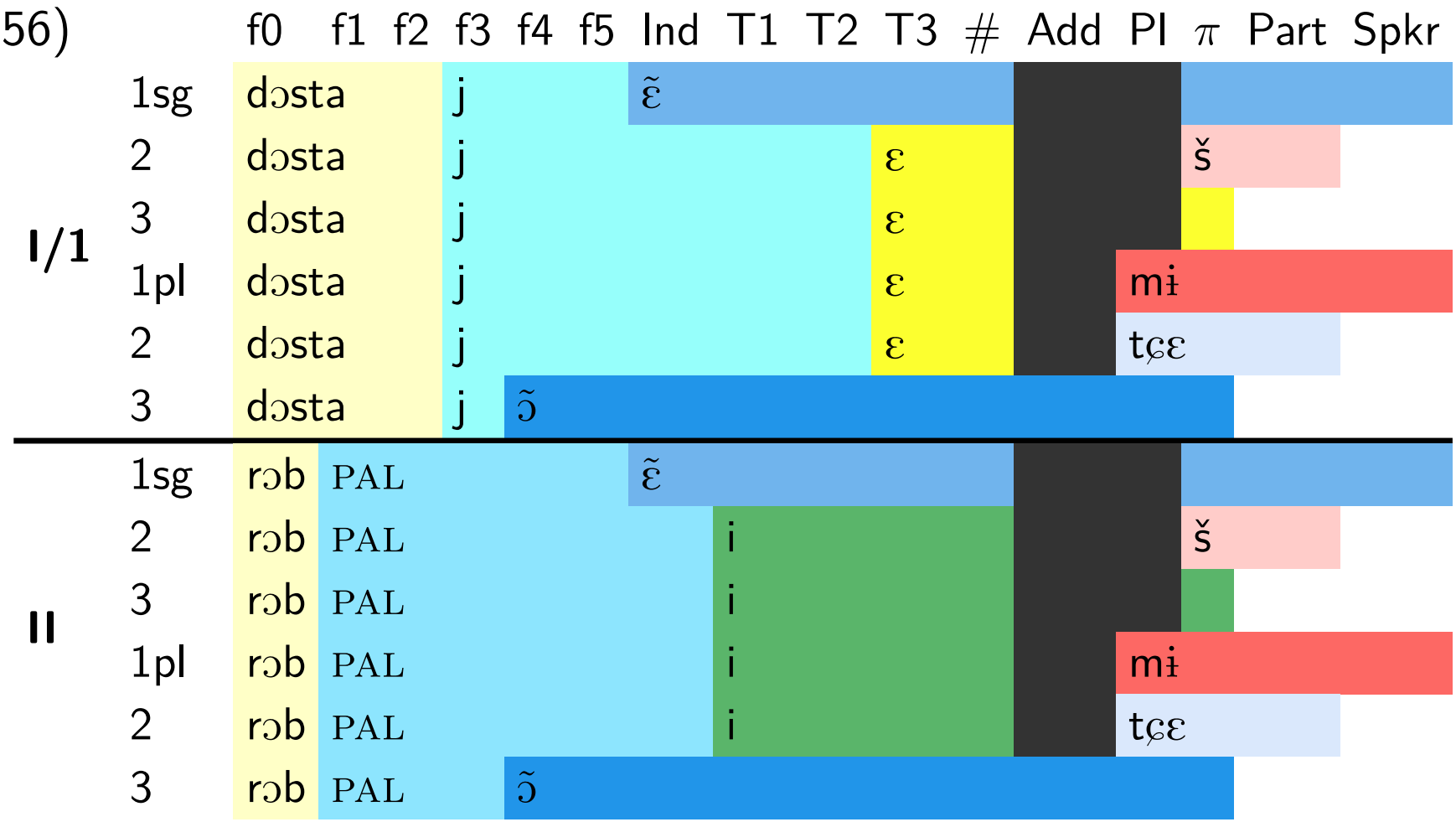
Class II

(55)


f0 f1 f2 f3 f4 f5 Ind T1 T2 T3 # Add Pl pi Part Spkr
1sg rɔb PAL ɛ̃
2 rɔb PAL i š
3 rɔb PAL i
1pl rɔb PAL i mɨ
2 rɔb PAL i tɕɛ
3 rɔb PAL ɔ̃

Class I vs. II

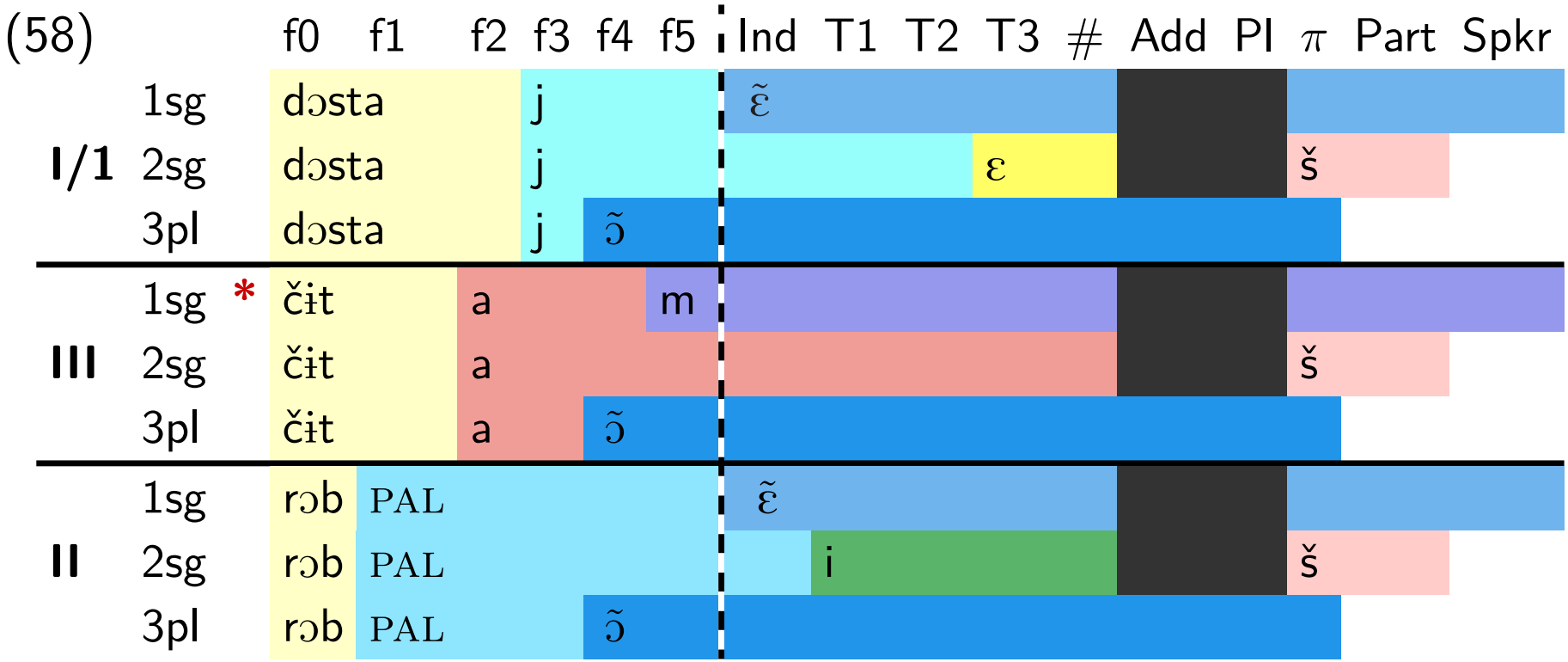
(56)



Class III

(57)	1sg	čɨt	a	m
	2	čɨt	a	š
	3	čɨt	a	
	1pl	čɨt	a	mɨ
	2	čɨt	a	tɕɛ
	3	čɨt	a(j)	ɔ̃

Class III: an impossible analysis

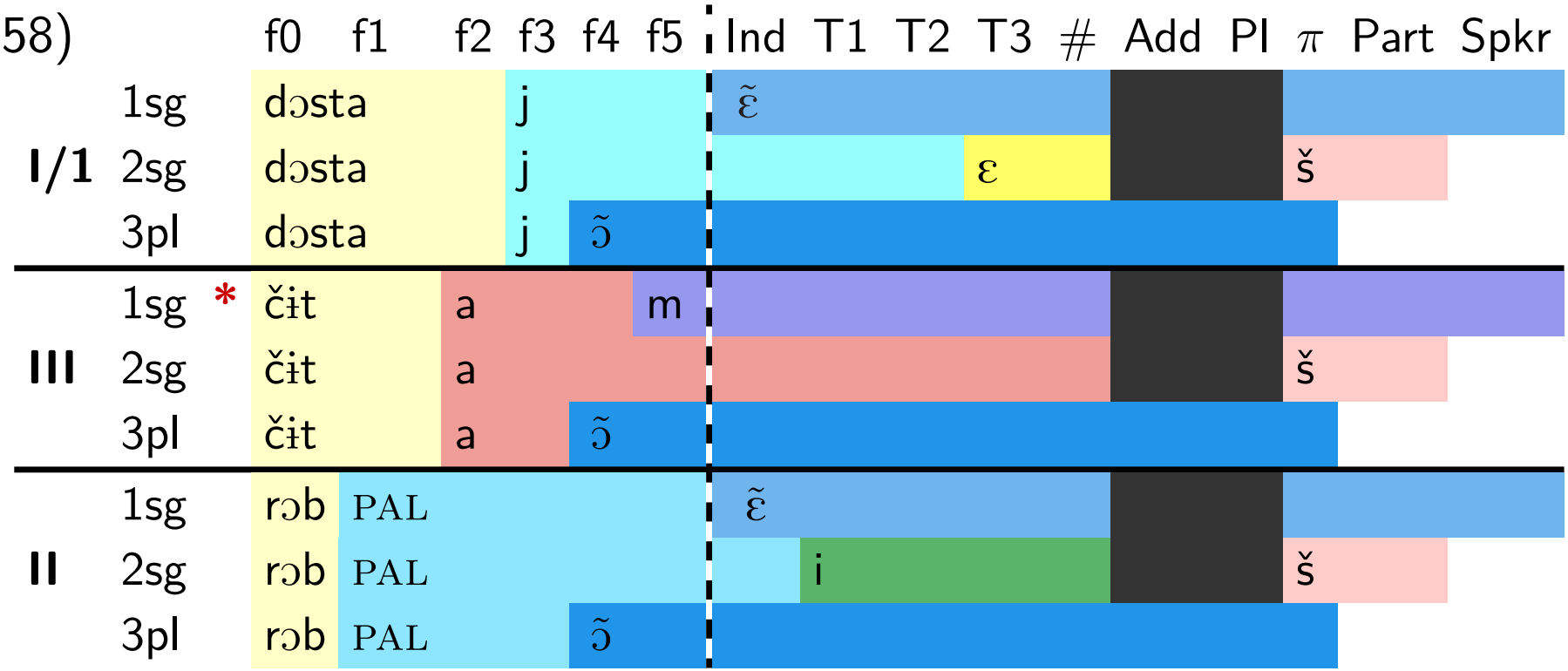


Question:

Why doesn't lexicalization of class III SPKR involve backtracking to IND?

Class III: an impossible analysis

(58)

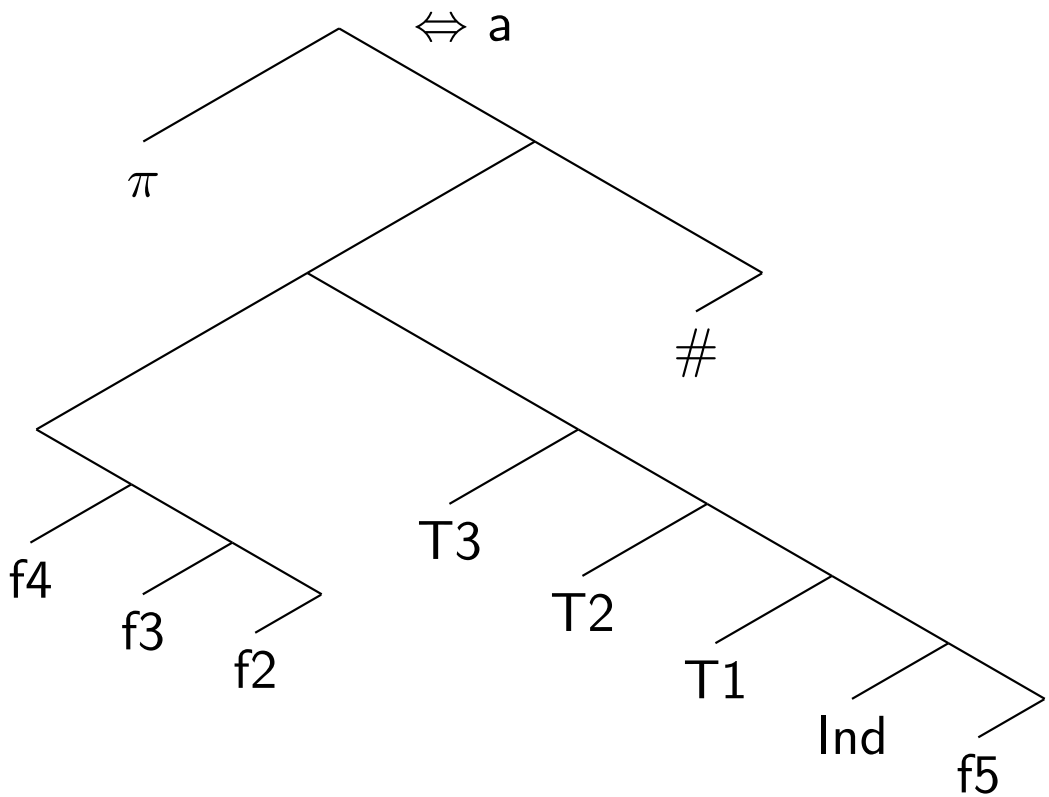


Question:

Why doesn't lexicalization of class III SPKR involve backtracking to IND?

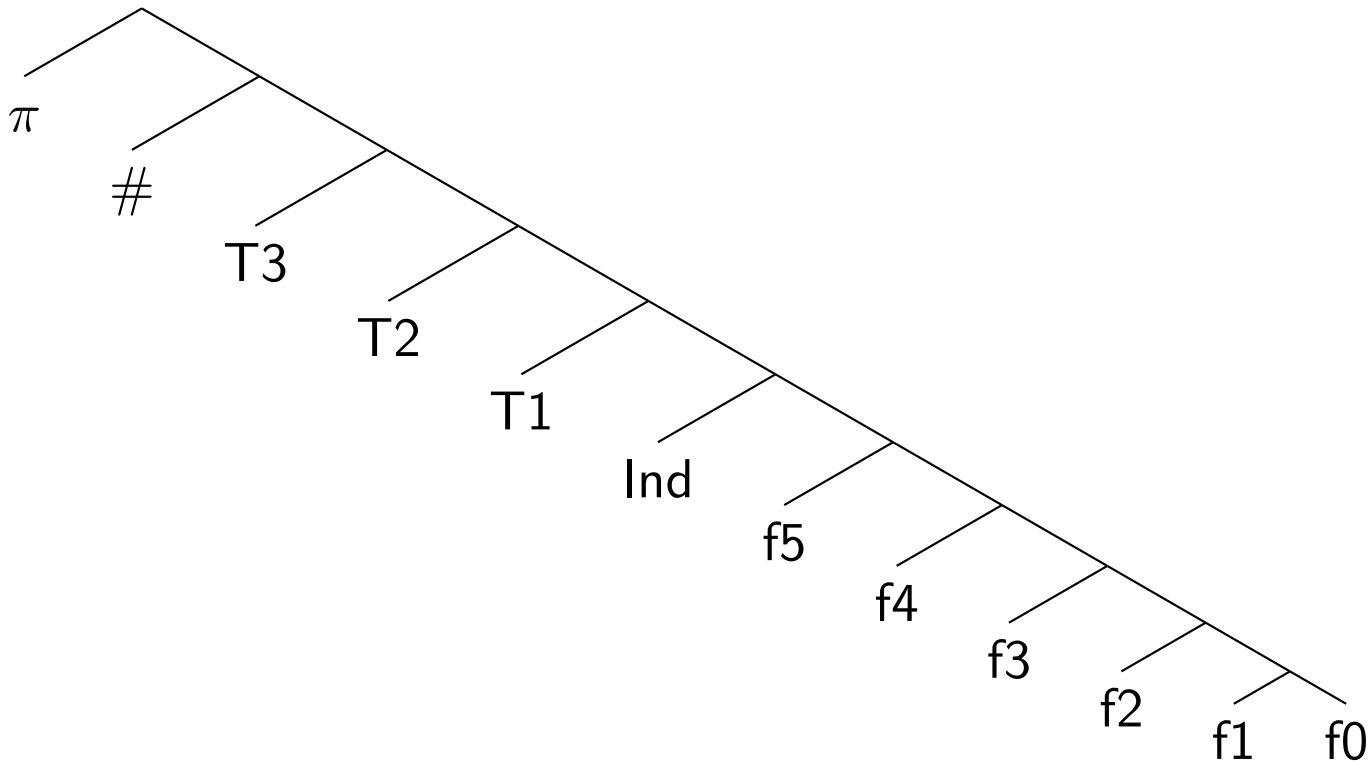
The shape of TV a

(59) lexical item



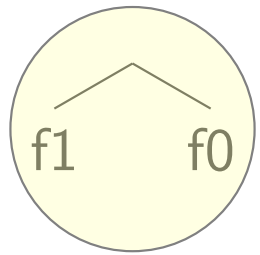
(Simplified) derivation of 3sg čɨt-a: fseq

(60)



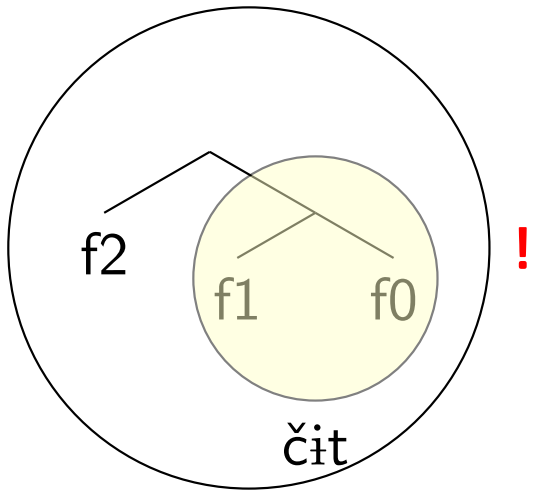
step 1: merge f and lexicalize fP

(61)



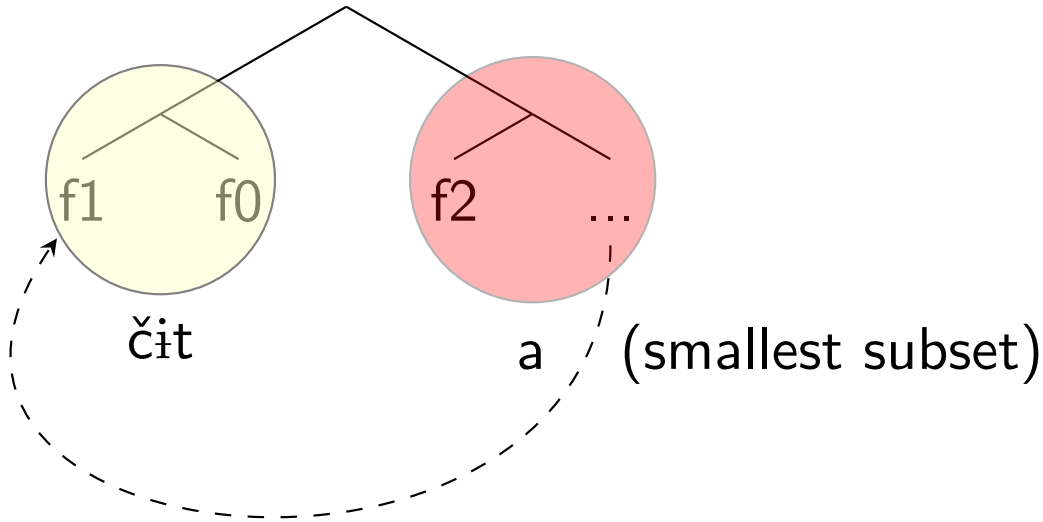
step 1: merge f and lexicalize fP

(62)



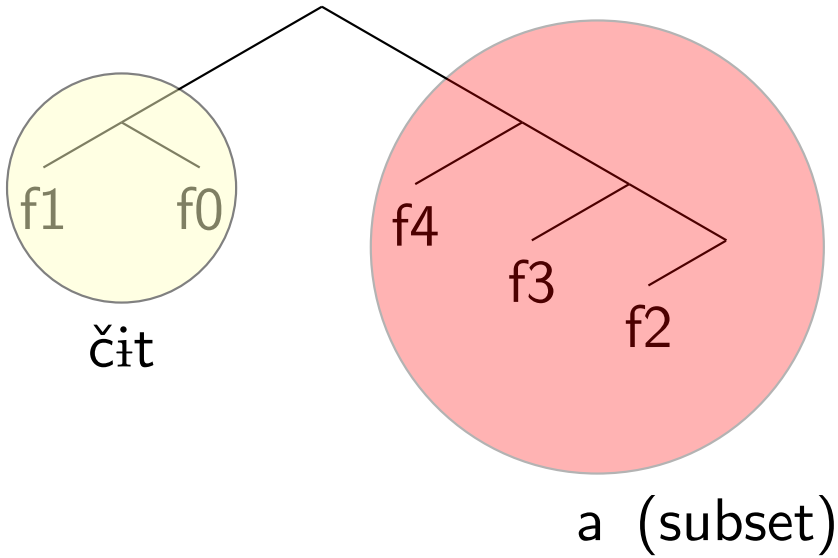
step 2: evacuate the closest non-remnant constituent and lexicalize fP

(63)



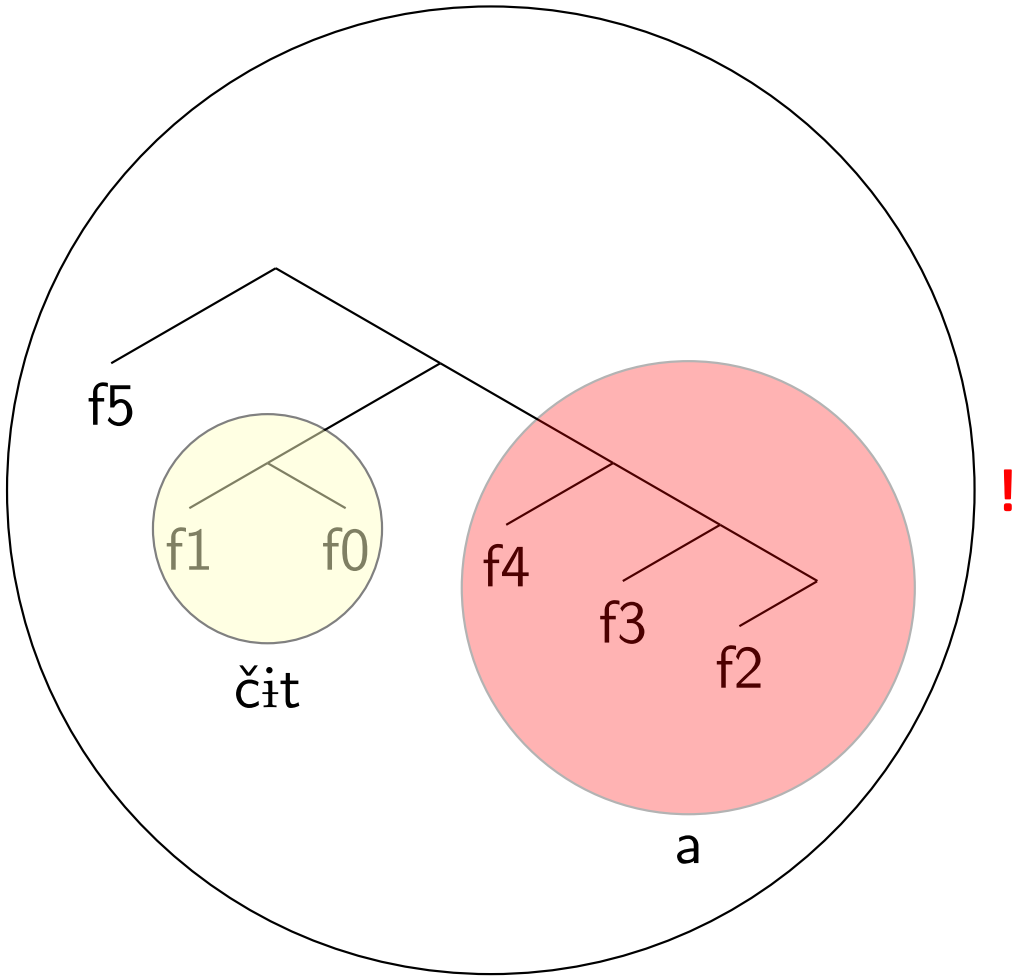
step 2: evacuate the closest non-remnant constituent and lexicalize fP (same for f2 – f4)

(64)



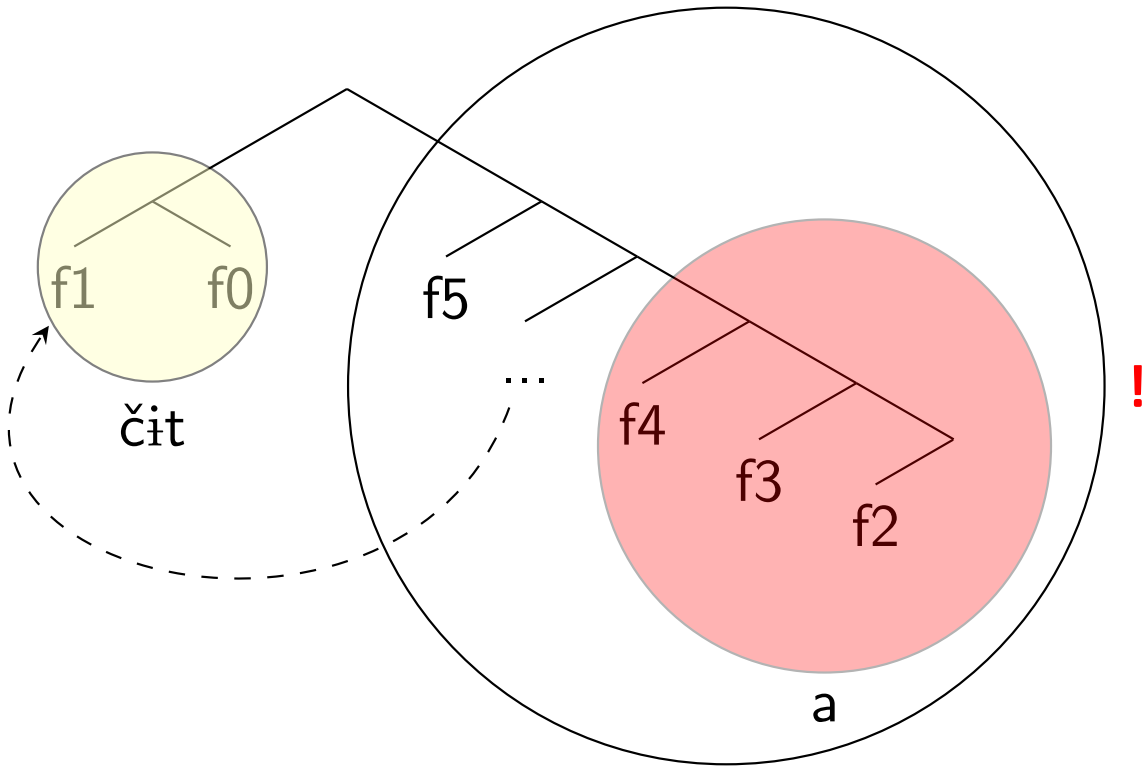
step 1: merge f and lexicalize fP

(65)



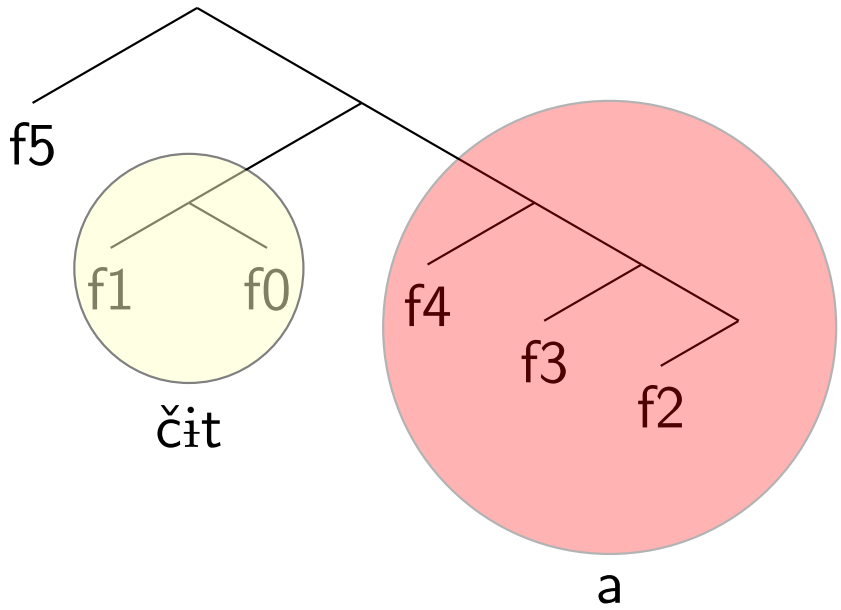
step 2: evacuate the closest non-remnant constituent and lexicalize fP

(66)



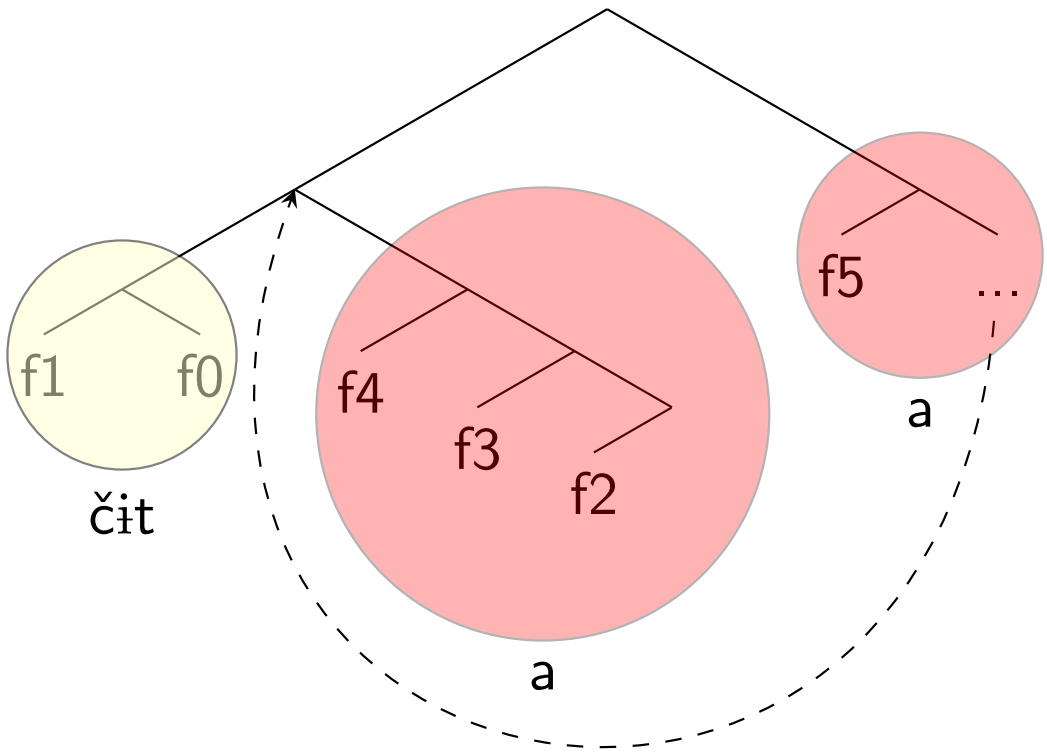
backtrack

(67)



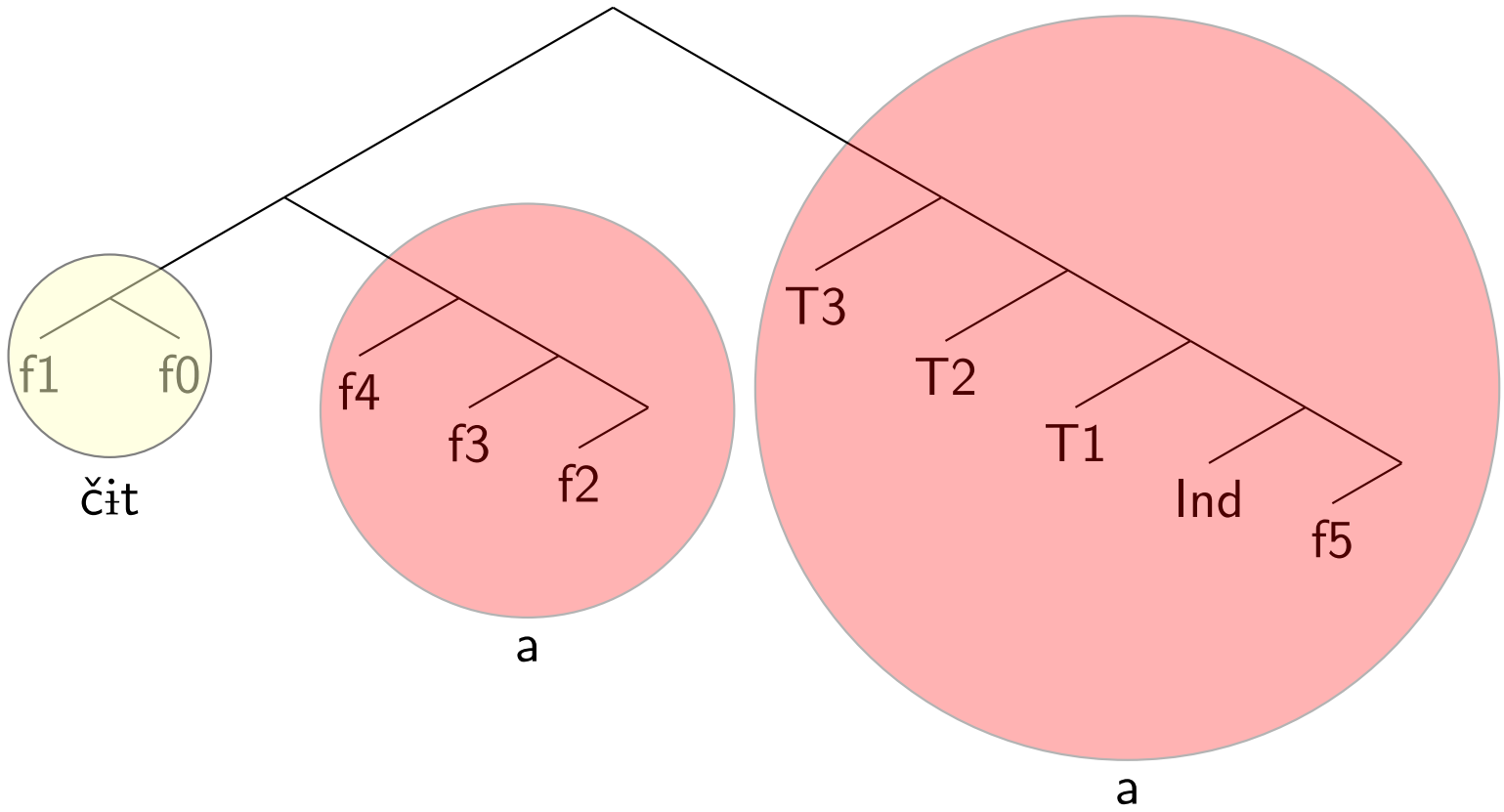
step 3: evacuate the immediately dominating node and lexicalize fP

(68)



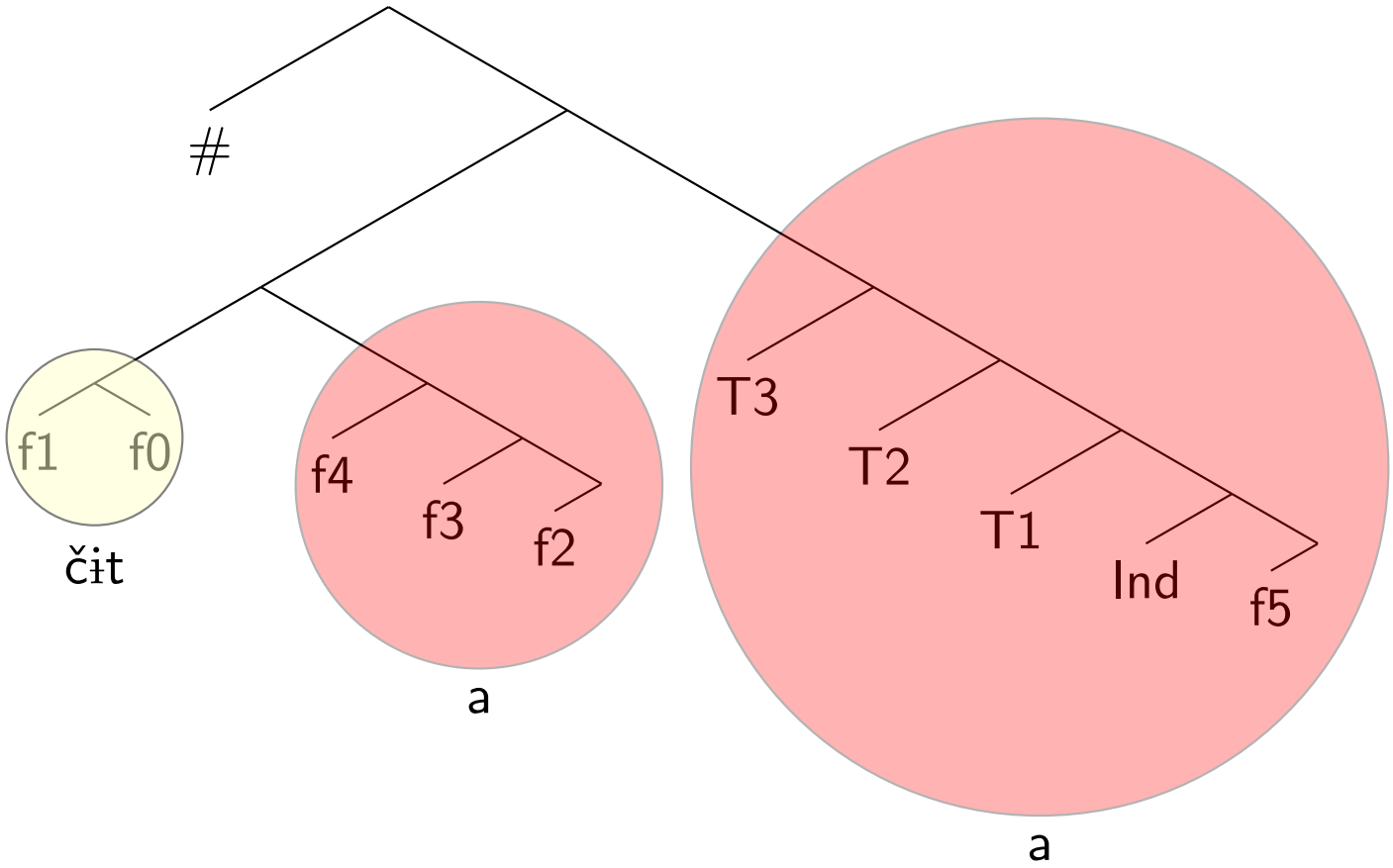
step 3: evacuate the immediately dominating node and lexicalize fP (same for f5 – T3)

(69)



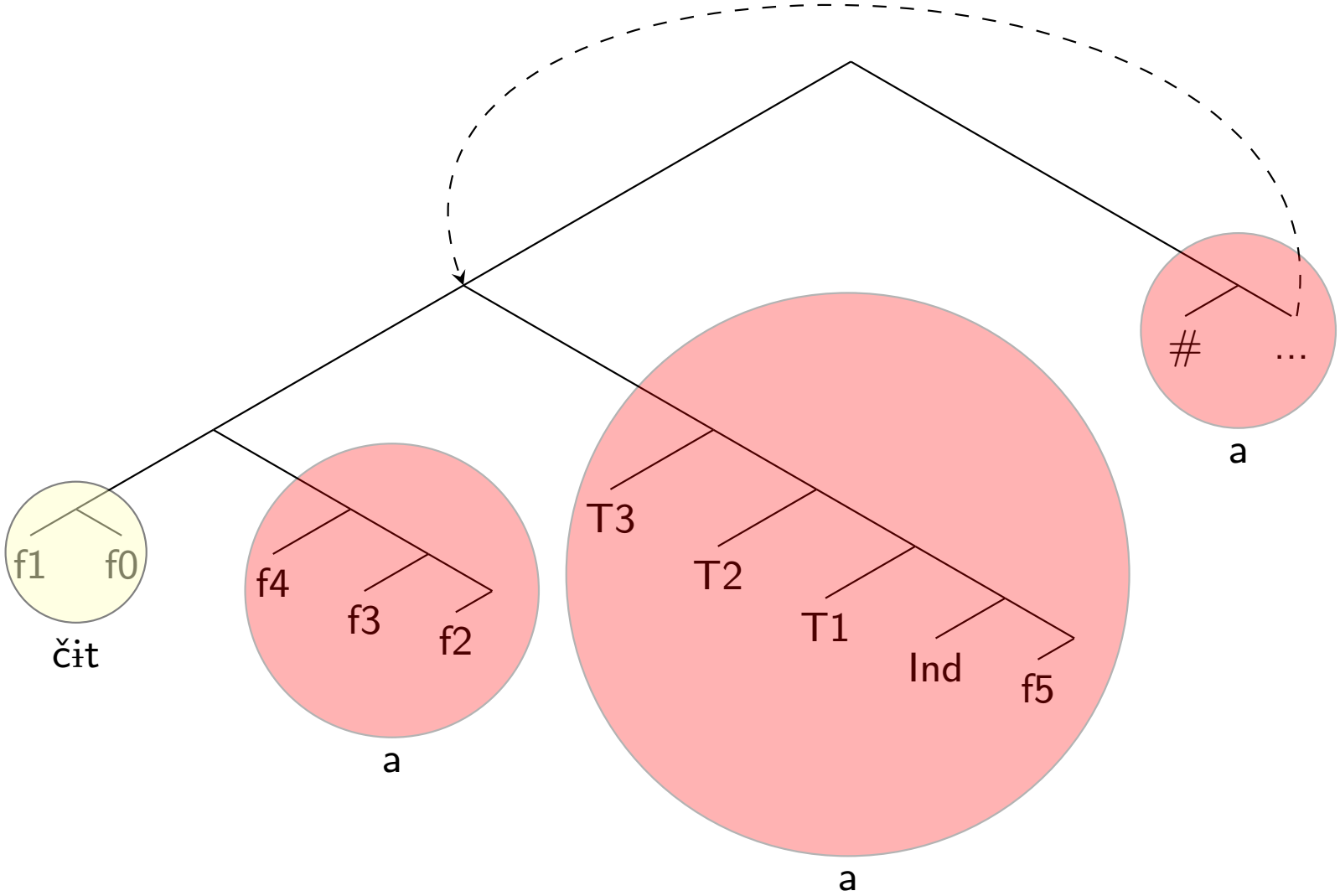
repeat for

(70)



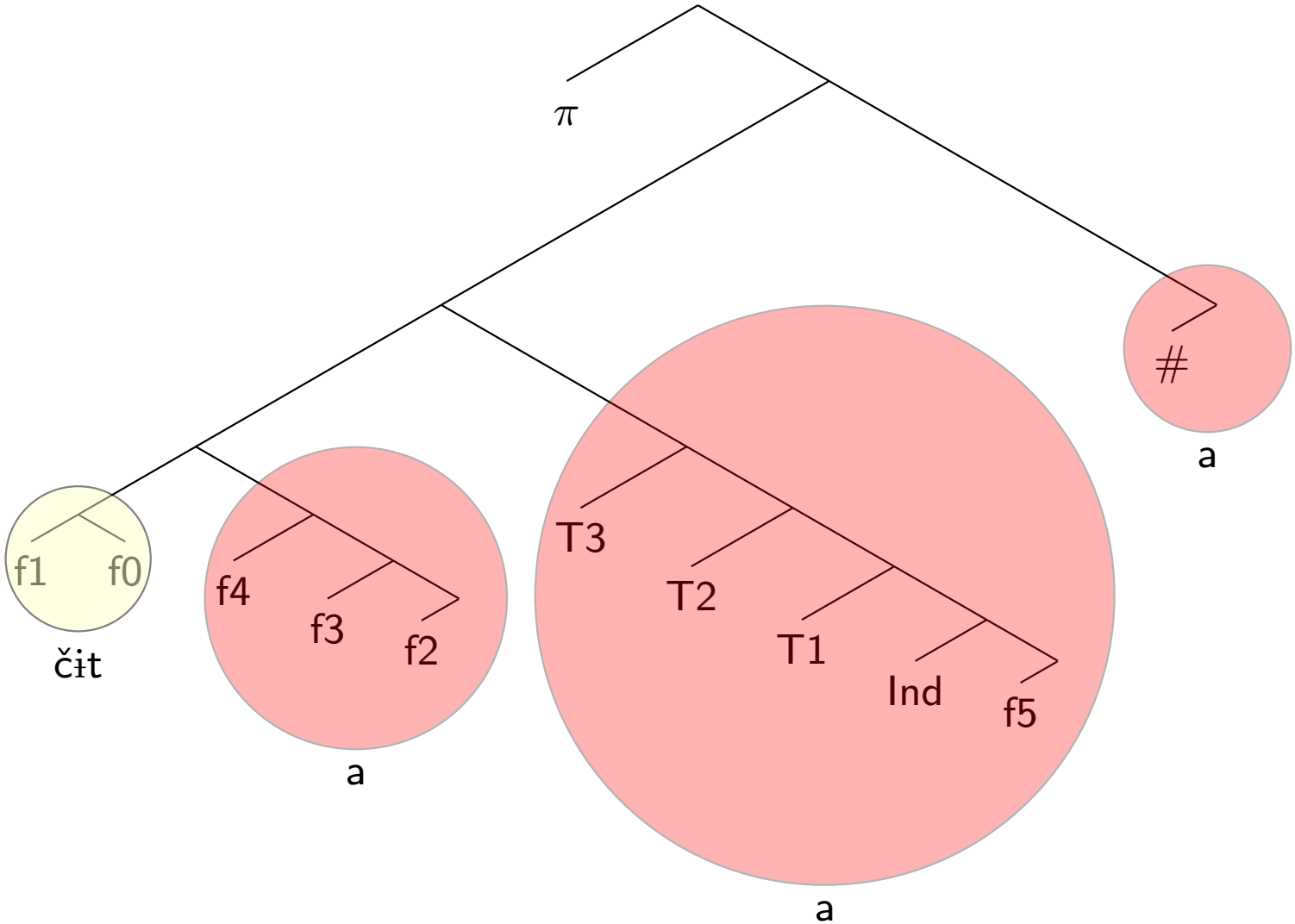
repeat for

(71)



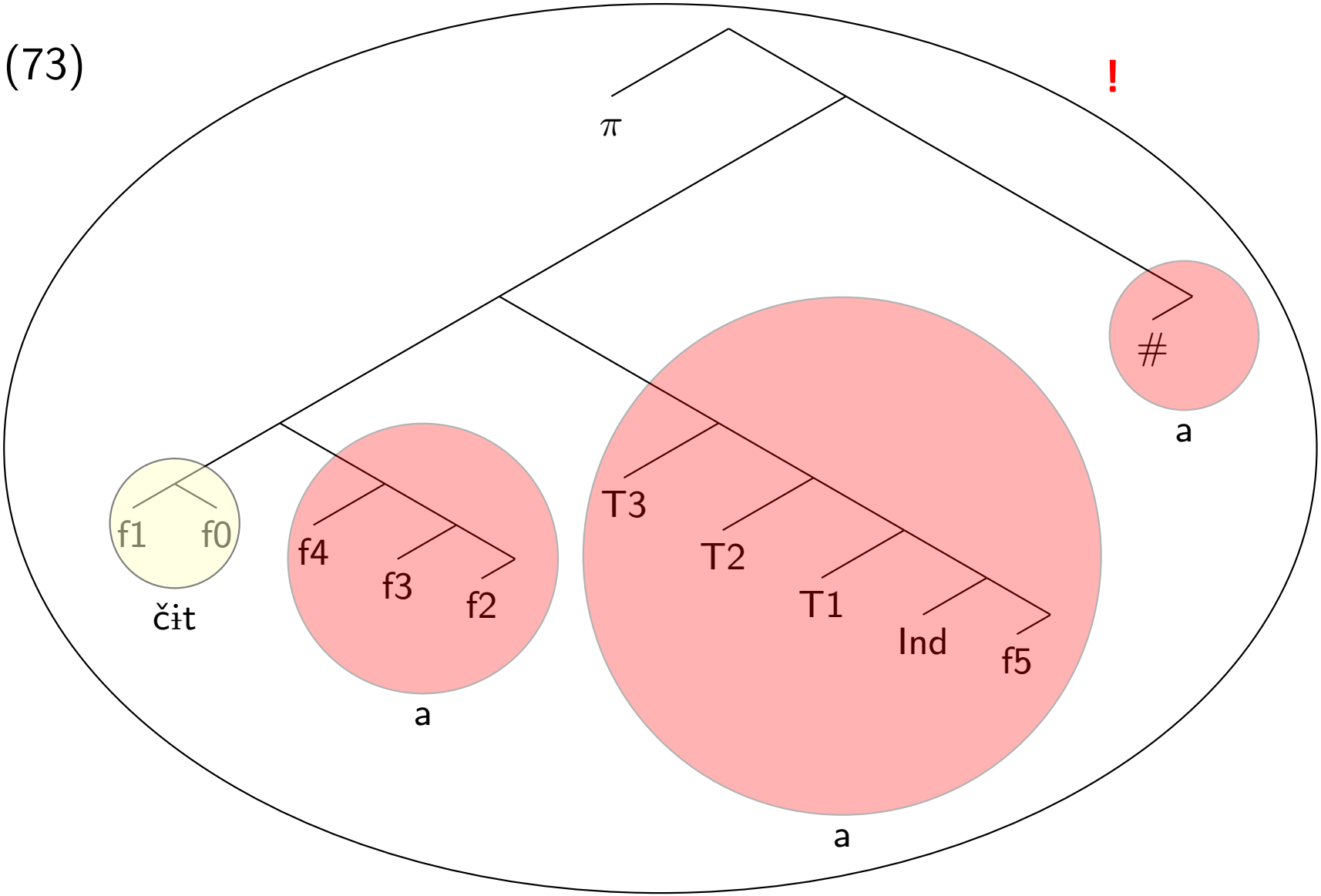
Add π

(72)



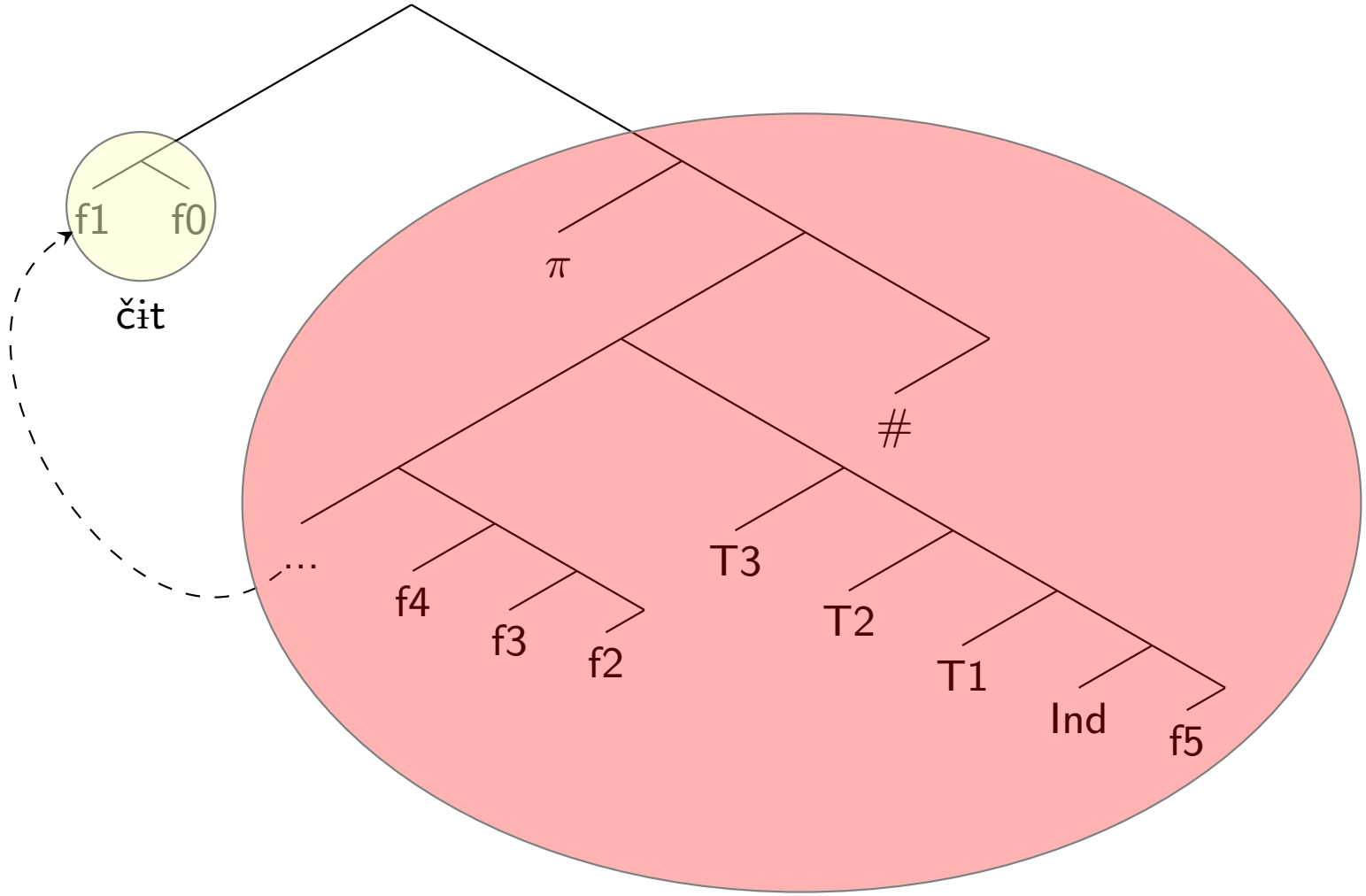
step 1: merge f and lexicalize fP

(73)



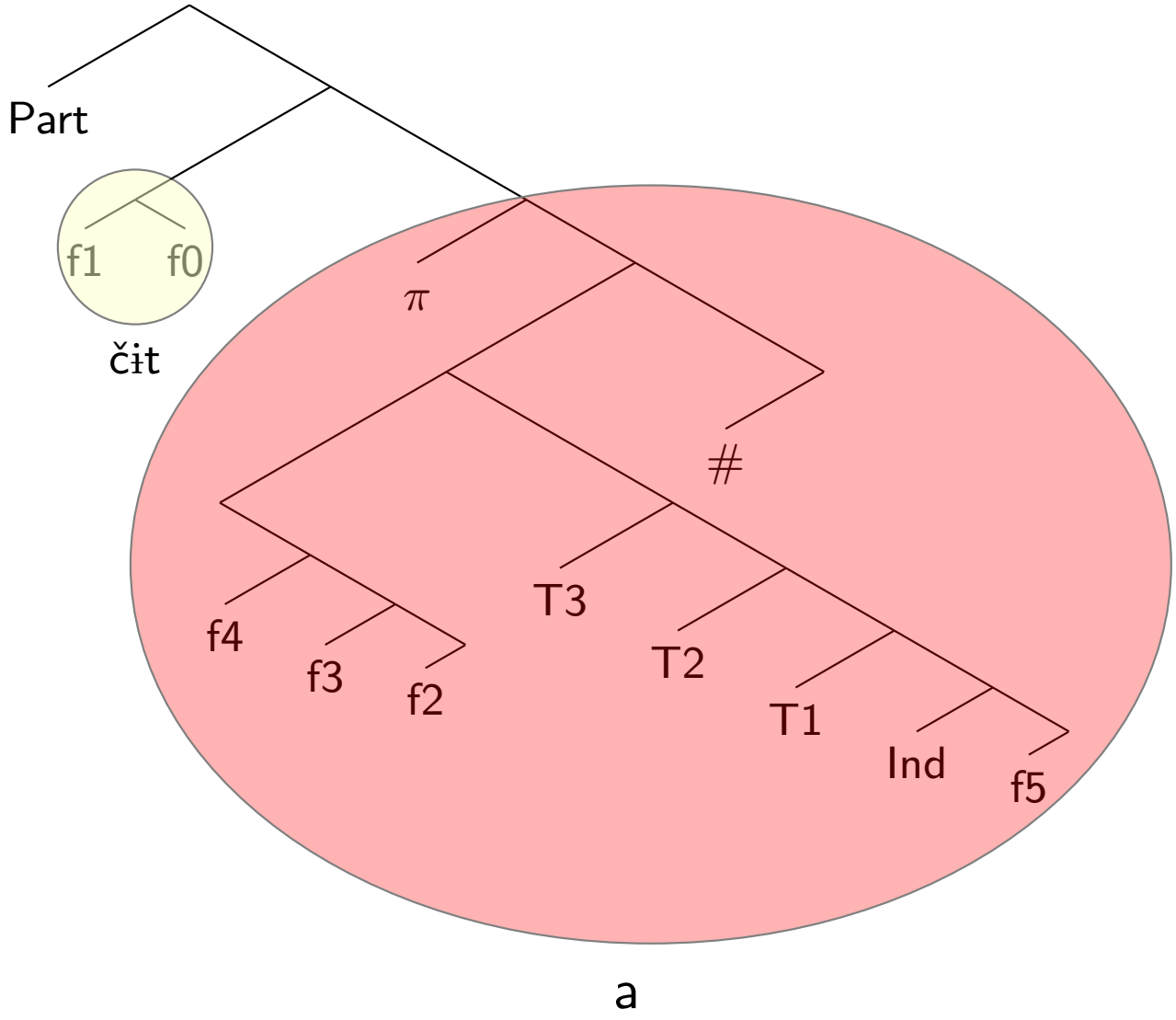
step 2: evacuate the closest non-remnant constituent and lexicalize fP

(74)



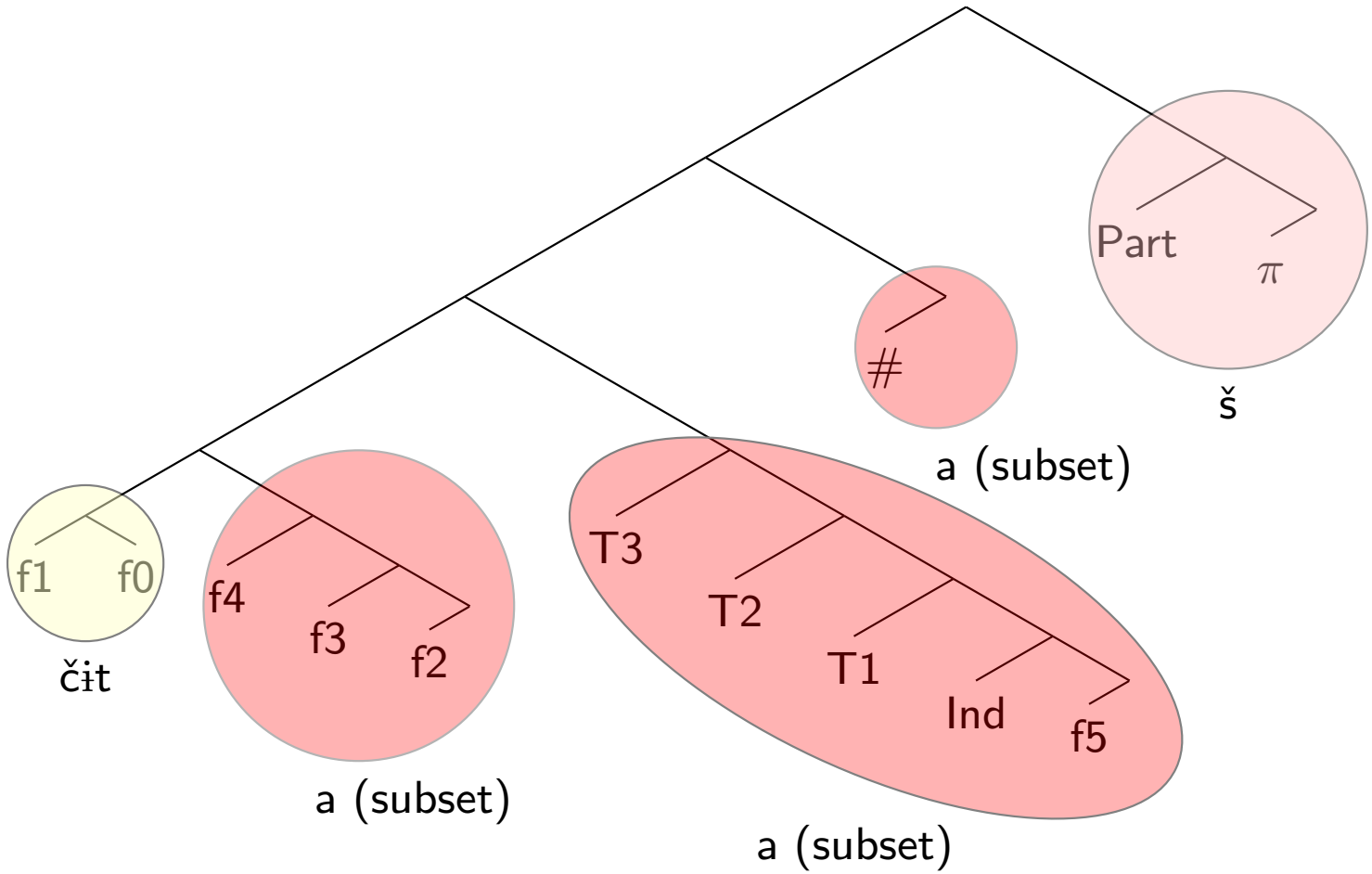
2sg: add Part

(75)



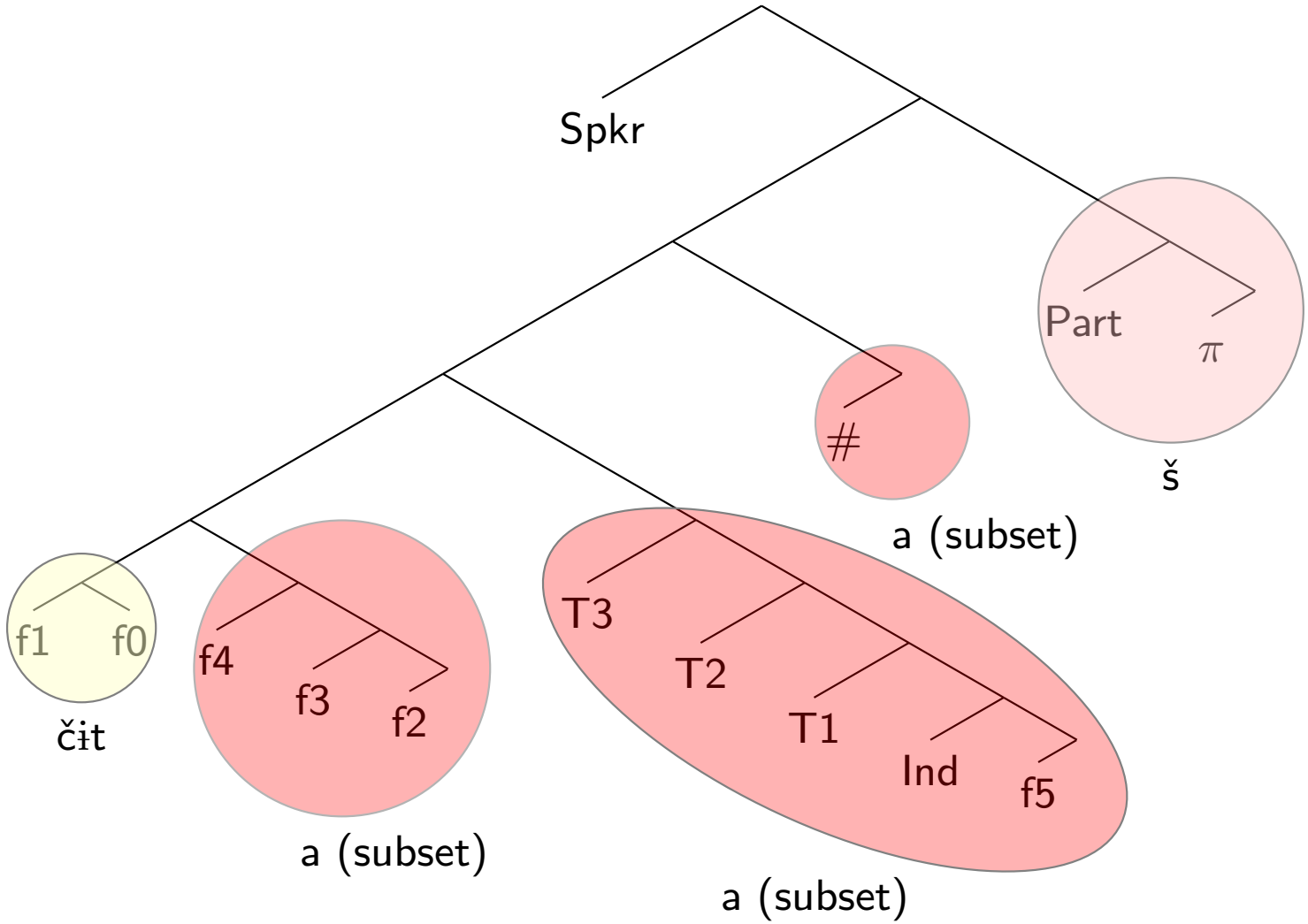
steps 1 – 3 fail, so backtrack to # (shortcut)

(76)



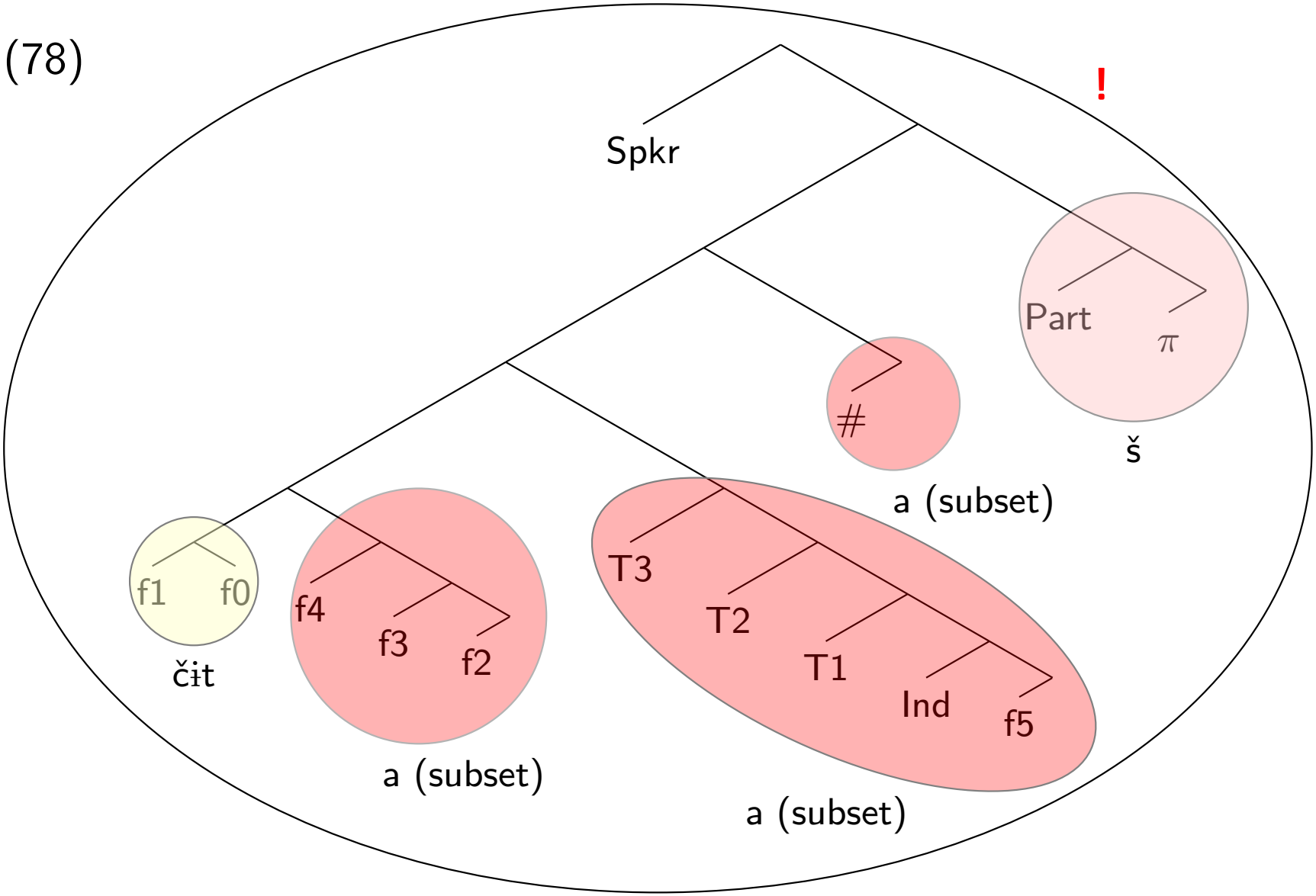
1sg: add Spkr

(77)



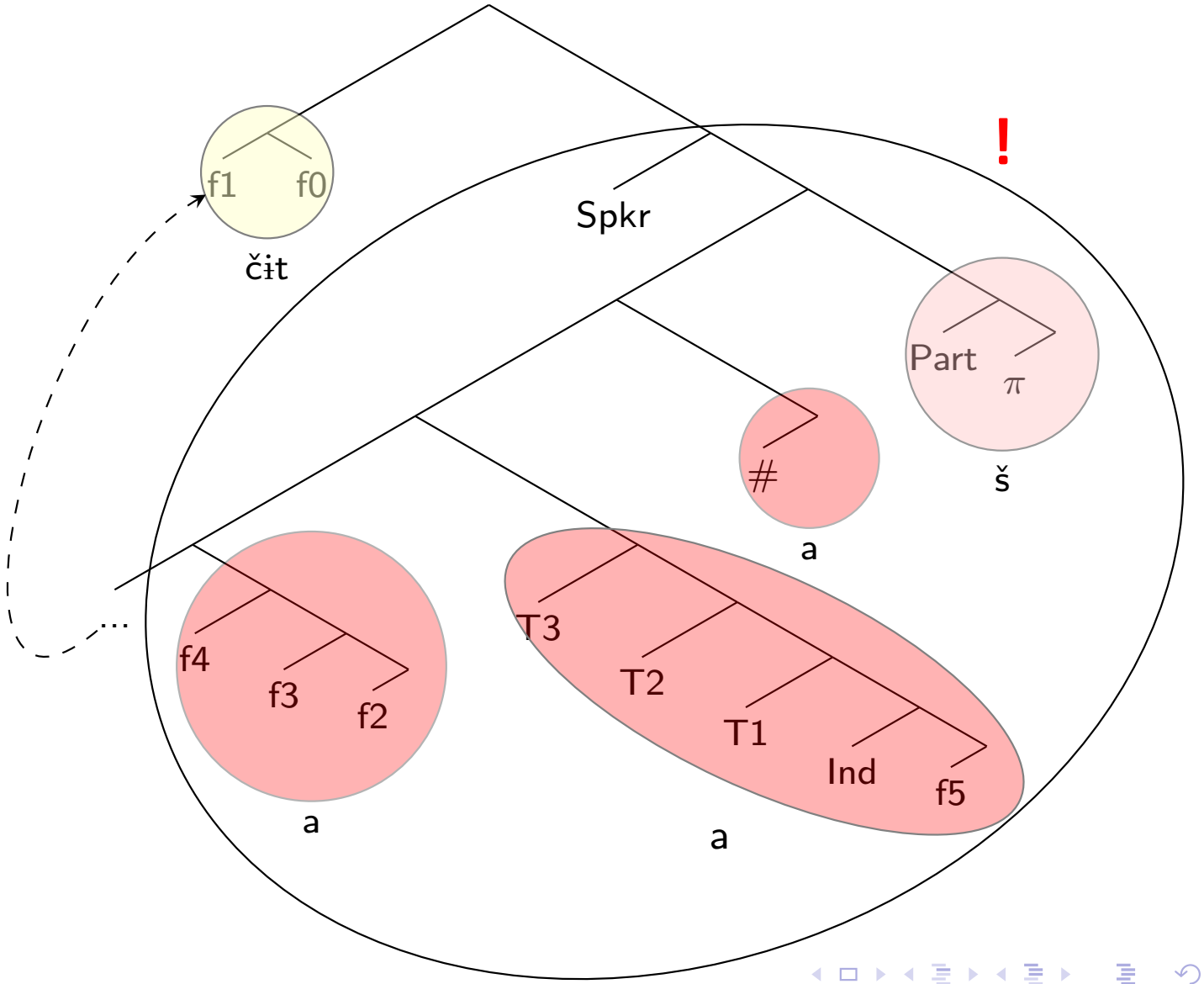
step 1: merge f and lexicalize fP

(78)



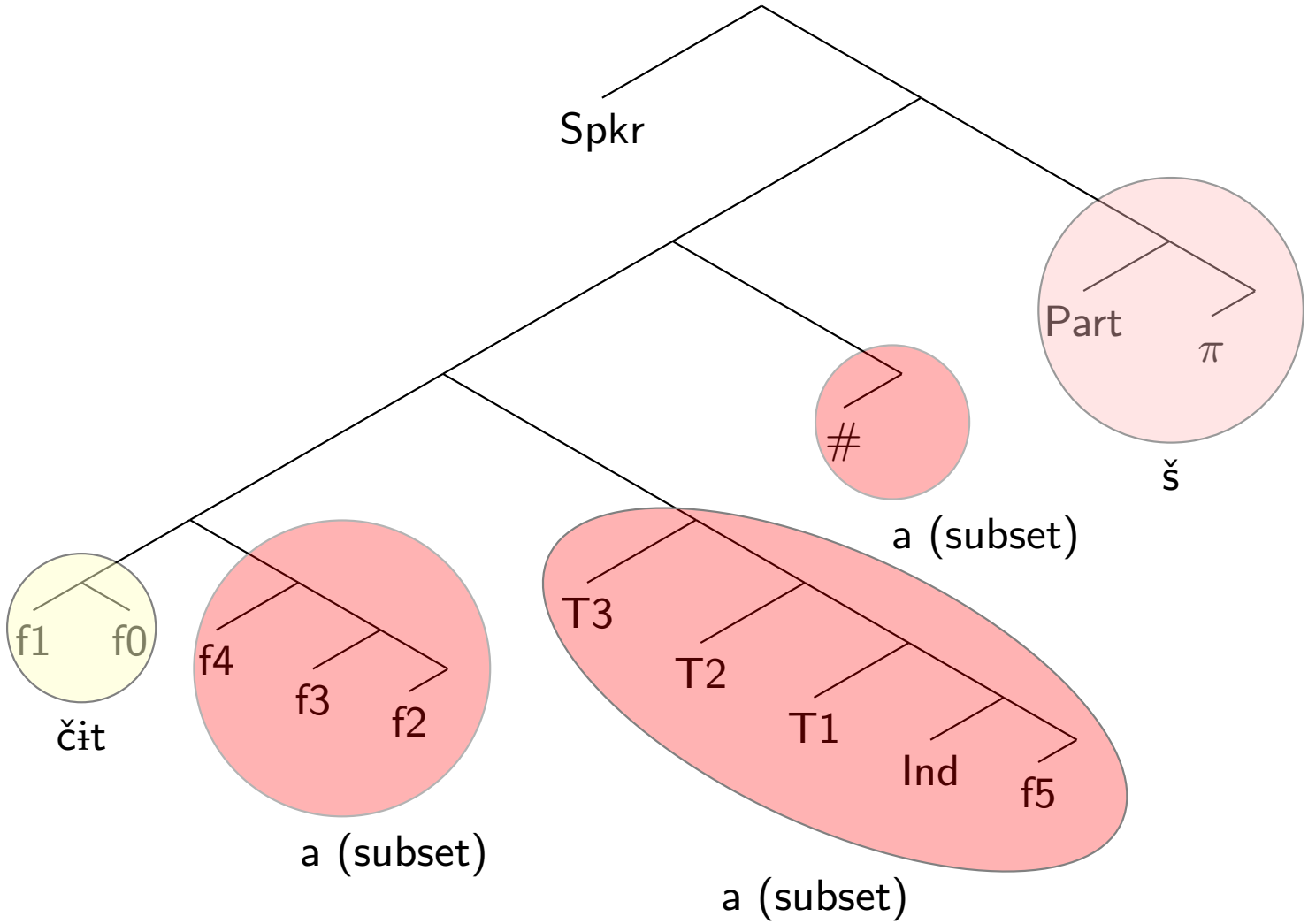
step 2: evacuate the closest non-remnant constituent and lexicalize fP

(79)



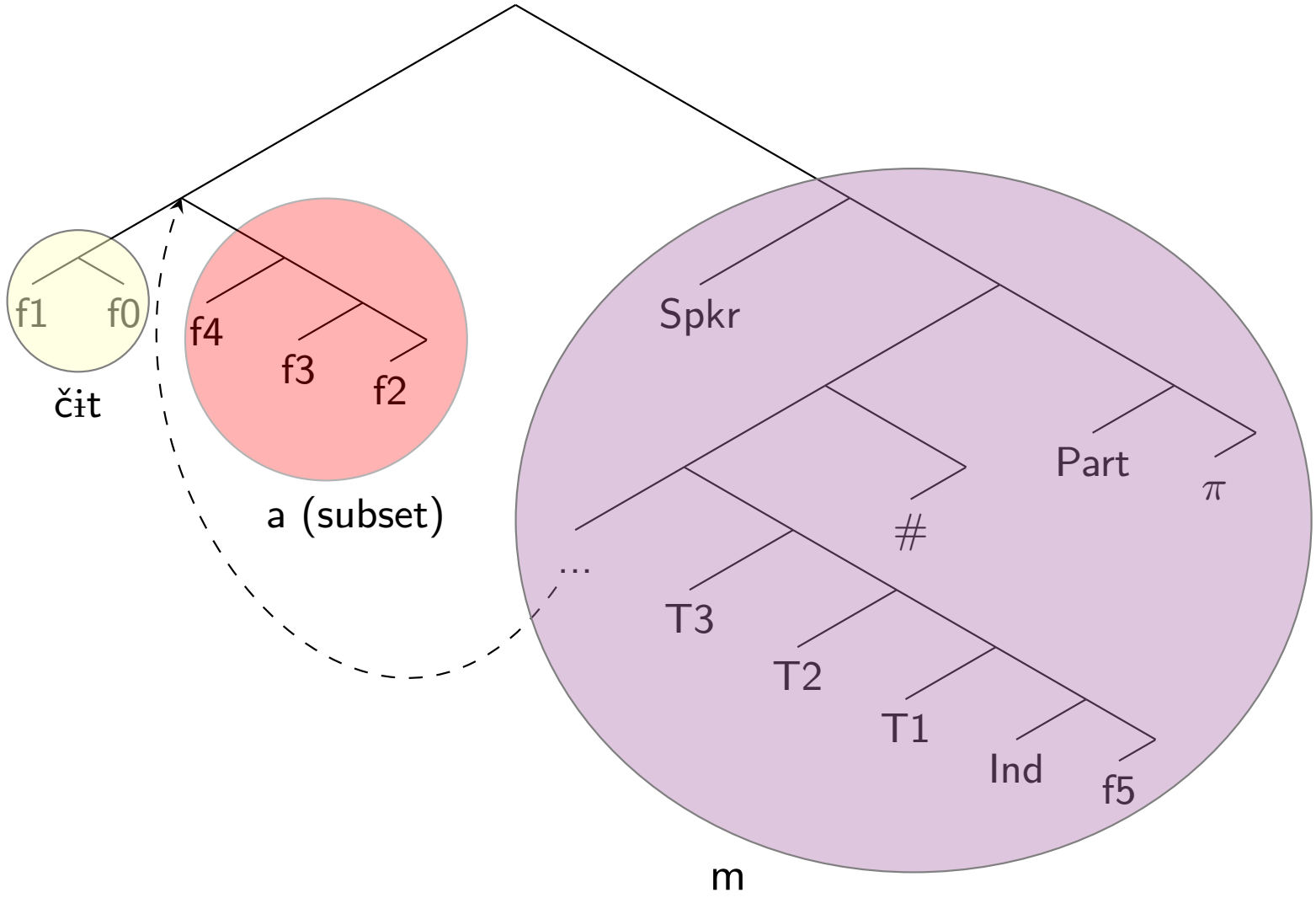
backtrack

(80)



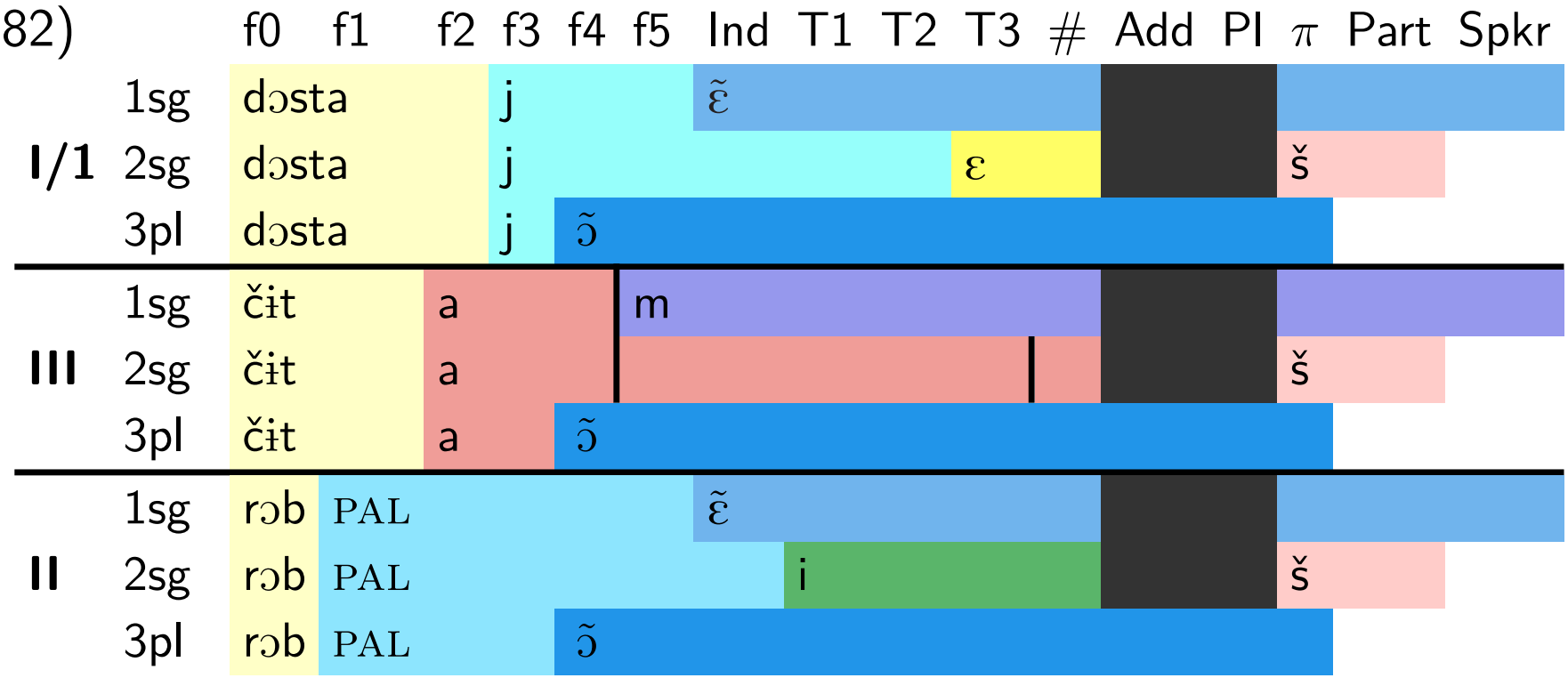
step 3: evacuate the immediately dominating node and lexicalize fP

(81)



1sg: class III vs. I & II

(82)

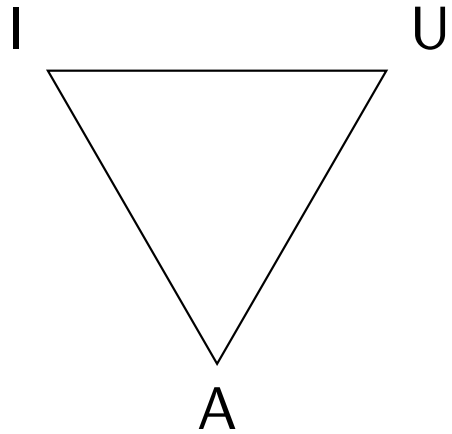


Class III vs. IV

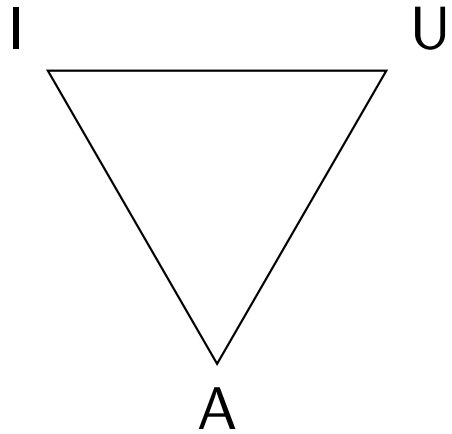
(83)

	III			IV		
1sg	čɨt	a	m	umj	ɛ	m
2	čɨt	a	š	umj	ɛ	š
3	čɨt	a		umj	ɛ	
1pl	čɨt	a	mɨ	umj	ɛ	mɨ
2	čɨt	a	tɕɛ	umj	ɛ	tɕɛ
3	čɨt	a(j)	ɔ̃	umj	ɛ(j)	ɔ̃

Element theory

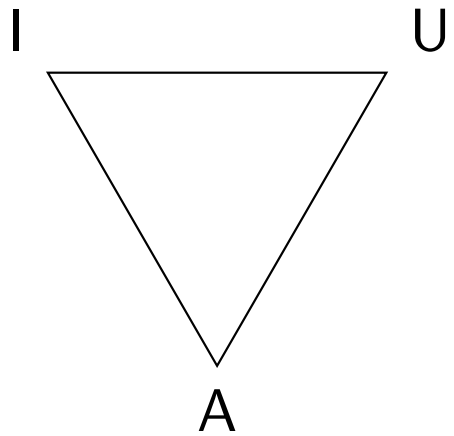


Element theory



A	→	a
I	→	i
U	→	u
I A	→	ɛ
A U	→	ɔ
I U	→	ɨ

Element theory



$$A \rightarrow a$$

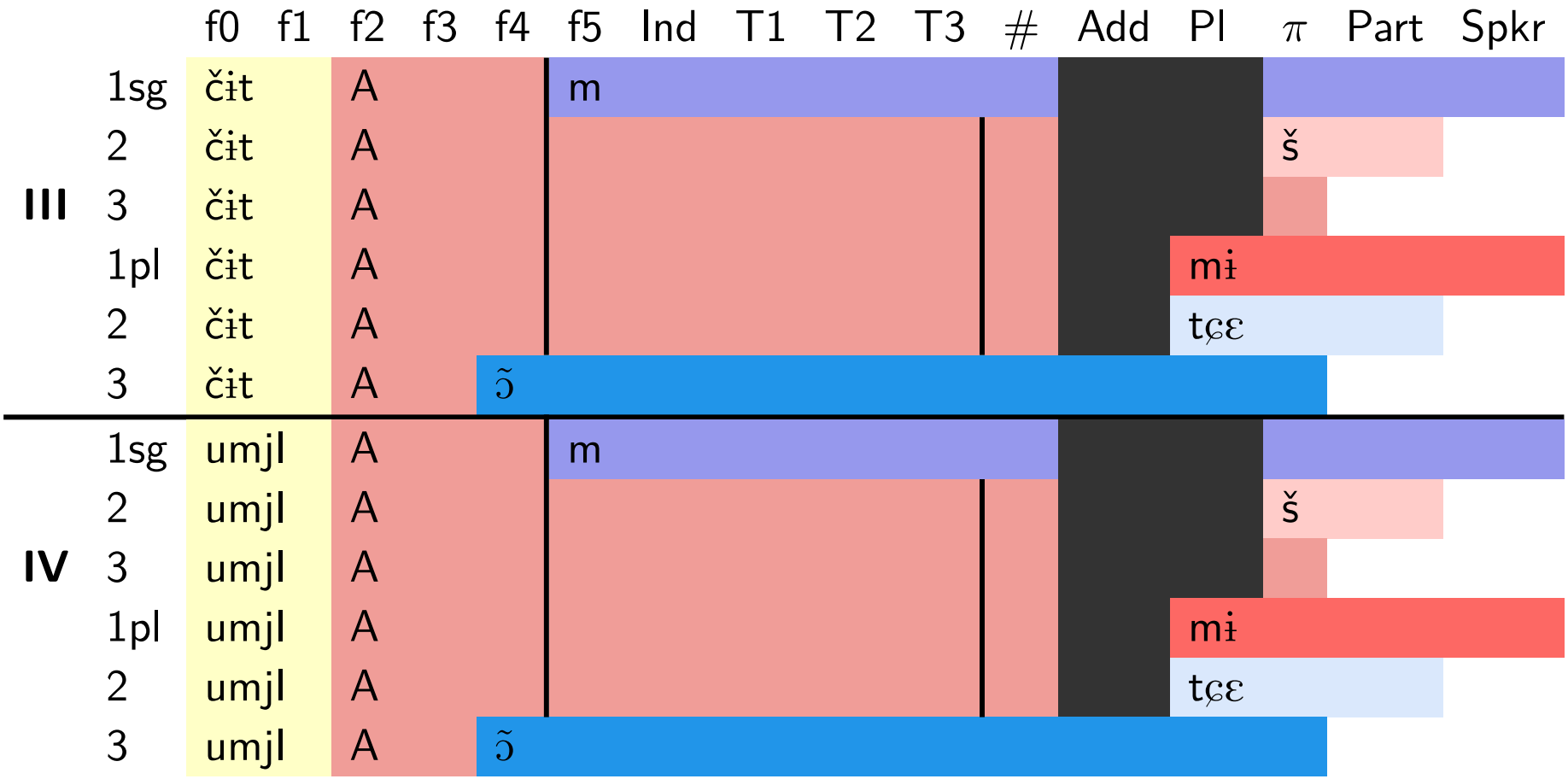
$$IA \rightarrow \varepsilon$$

Class III vs. IV with elements

(84)

	III			**IV**		
1sg	čɨt	A	m	umjl	A	m
2	čɨt	A	š	umjl	A	š
3	čɨt	A		umjl	A	
1pl	čɨt	A	mɨ	umjl	A	mɨ
2	čɨt	A	tɕɛ	umjl	A	tɕɛ
3	čɨt	A	ɔ̃	umjl	A	ɔ̃

Classes III and IV



Conclusion

Morphosyntactic and morphophonological complexity in the Polish present tense forms points to the following:

- verb roots vary in syntactic size
- verbal suffixes vary in syntactic size and shape

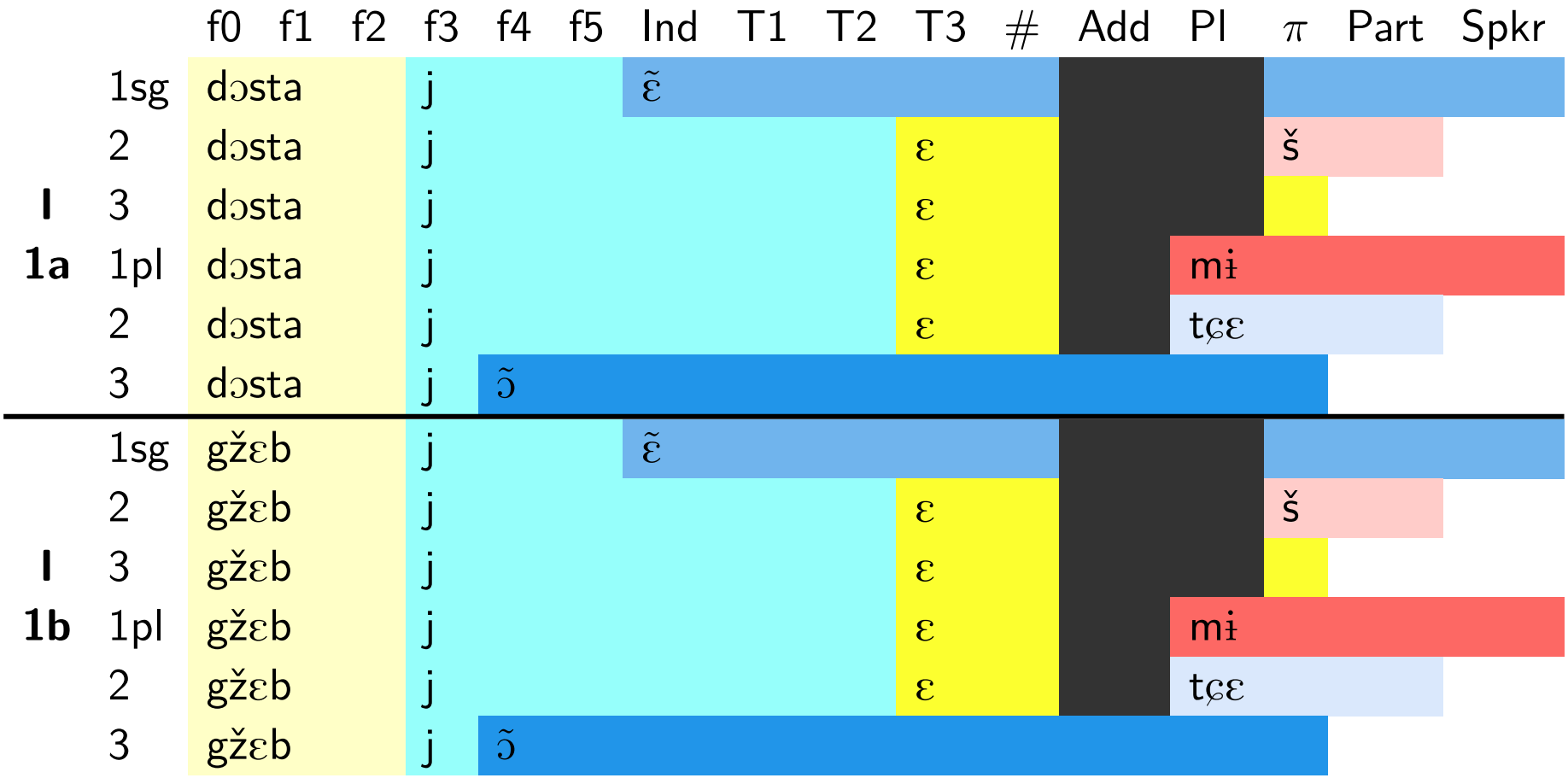
Conclusion

Morphosyntactic and morphophonological complexity in the Polish present tense forms points to the following:

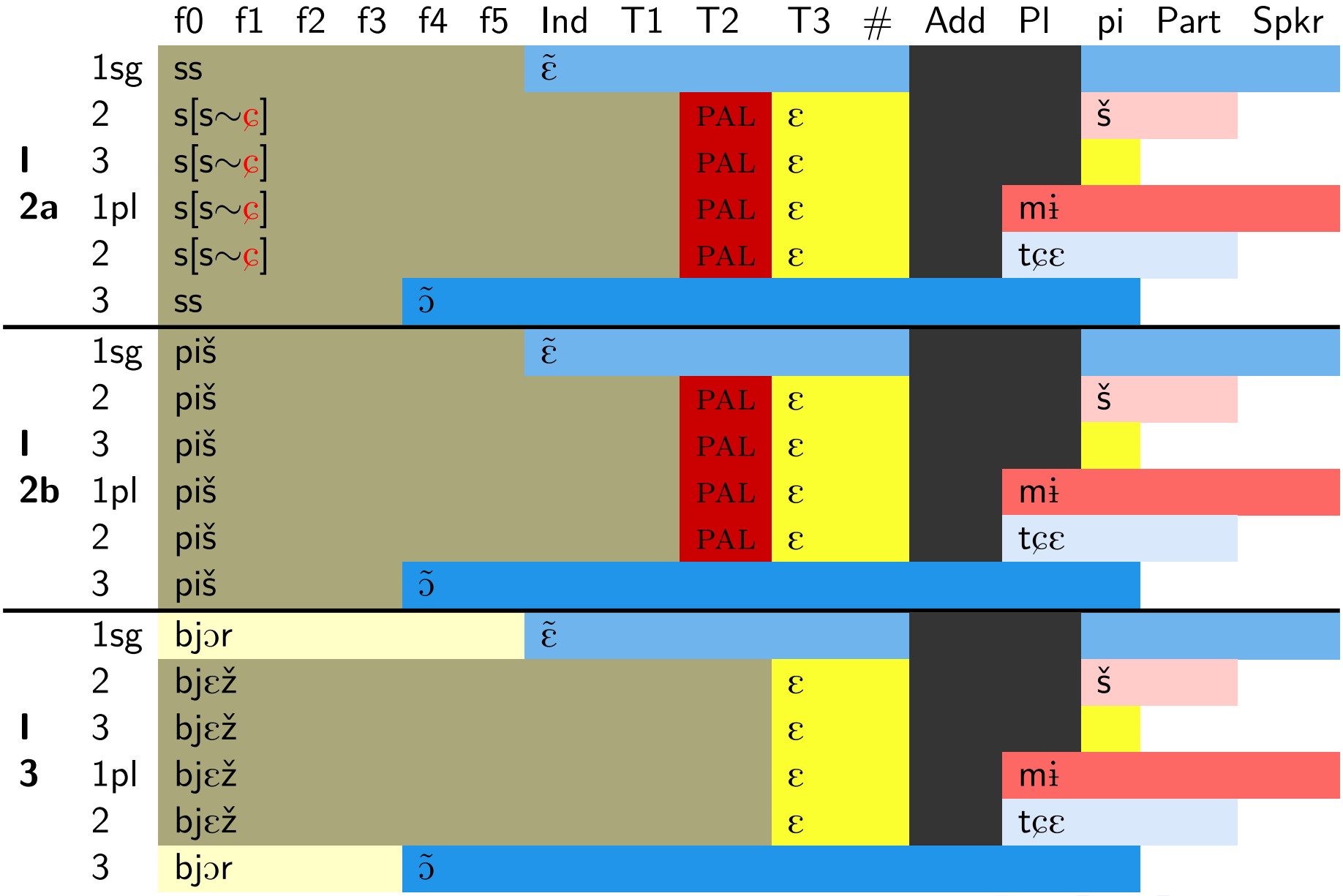
- verb roots vary in syntactic size
- verbal suffixes vary in syntactic size and shape

Thank you!

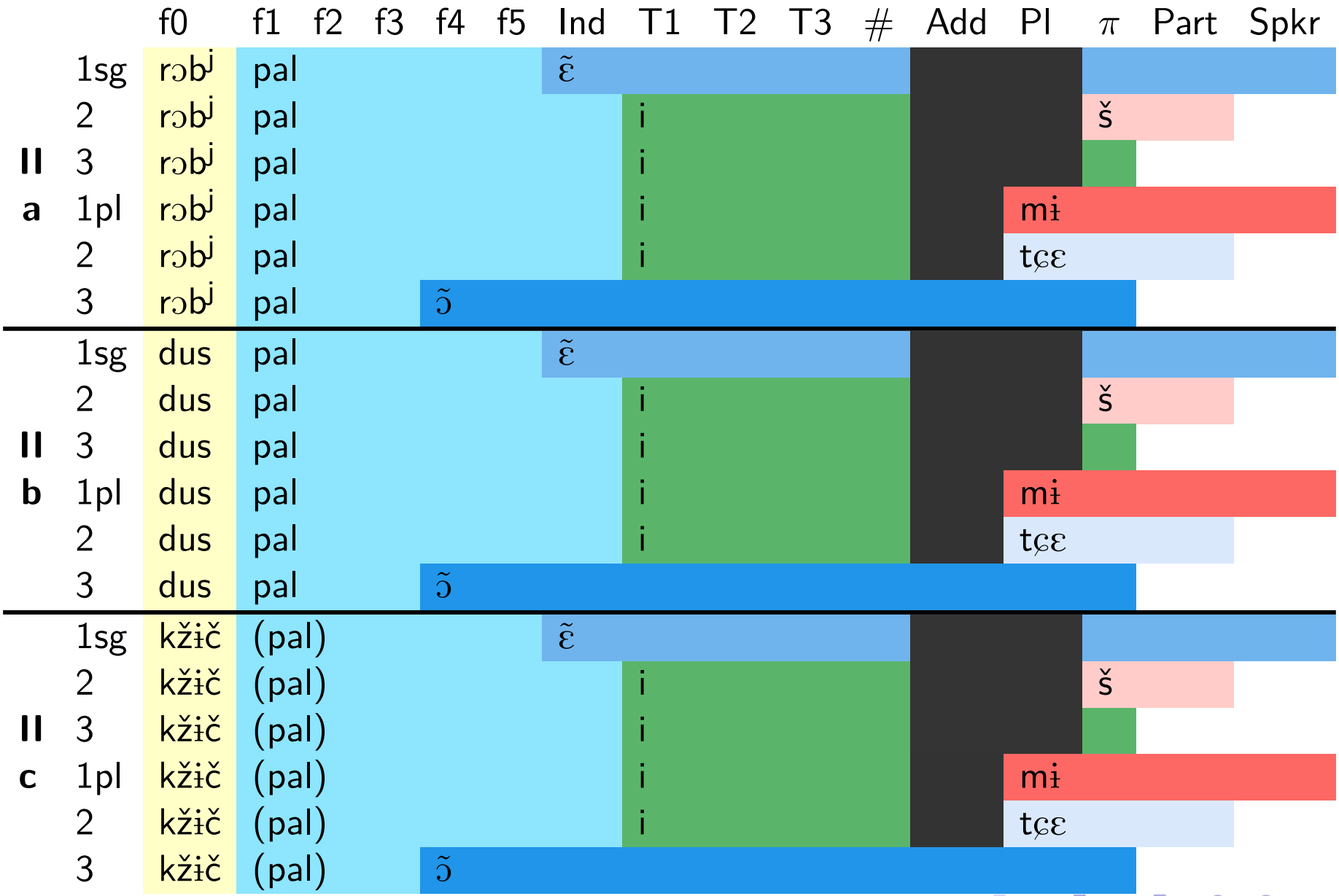
All inflection classes: I/1



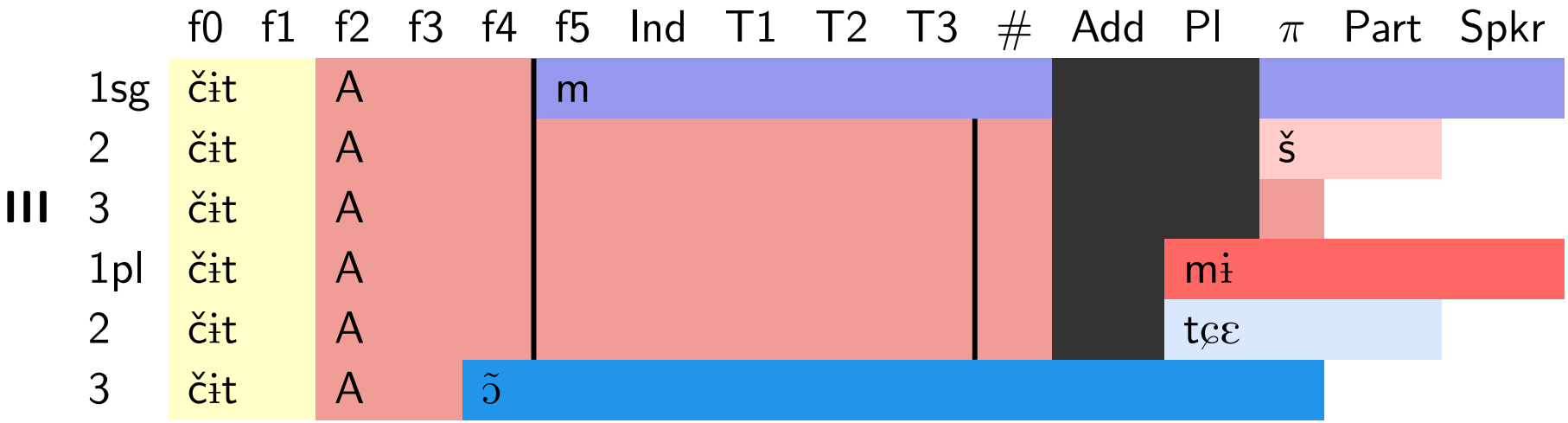
All inflection classes: I/2 & 3



All inflection classes: II



All inflection classes: III



All inflection classes: IV (surface ɛ)