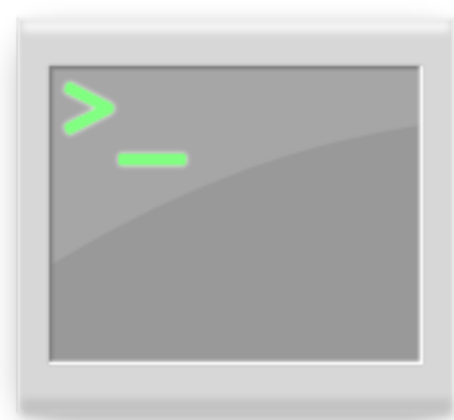
Multi-Language Modelling with Second Order Intensions



Vadim Zaytsev aka @grammarware

MULTI 2015

Multi-Level Transformation

SIDE STORY

(kind of)

```
S  ::= a+ b+ c+ & AB c+ & a+ BC;
AB ::= a AB? b;
BC ::= b BC? c;
```

(a)

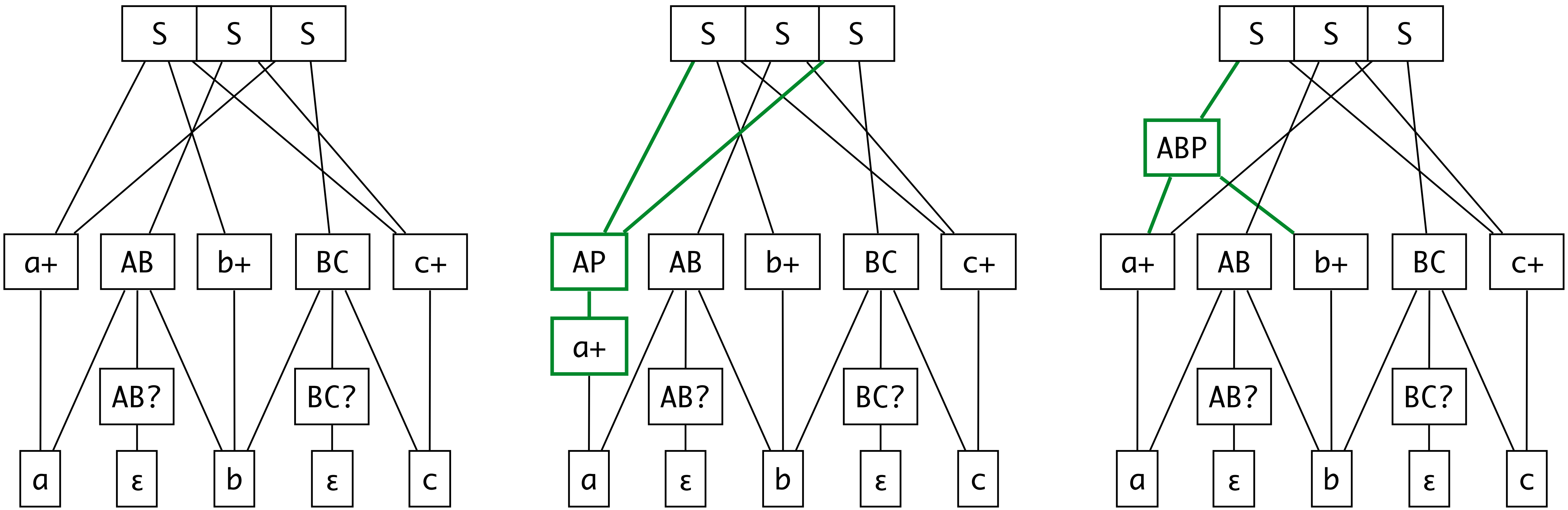
```
S  ::= AP b+ c+ & AB c+ & AP BC;
AB ::= a AB? b;
BC ::= b BC? c;
AP ::= a+;
```

(b)

```
S   ::= ABP c+ & AB c+ & a+ BC;
AB  ::= a AB? b;
BC  ::= b BC? c;
ABP ::= a+ b+;
```

(c)

Multi-Level Transformation




```
S  ::= a+ b+ c+ & AB c+ & a+ BC;
AB ::= a AB? b;
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(a)

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S  ::= AP b+ c+ & AB c+ & AP BC;
AB ::= a AB? b;
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AP ::= a+;
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(b)

```
S   ::= ABP c+ & AB c+ & a+ BC;
AB  ::= a AB? b;
BC  ::= b BC? c;
ABP ::= a+ b+;
```

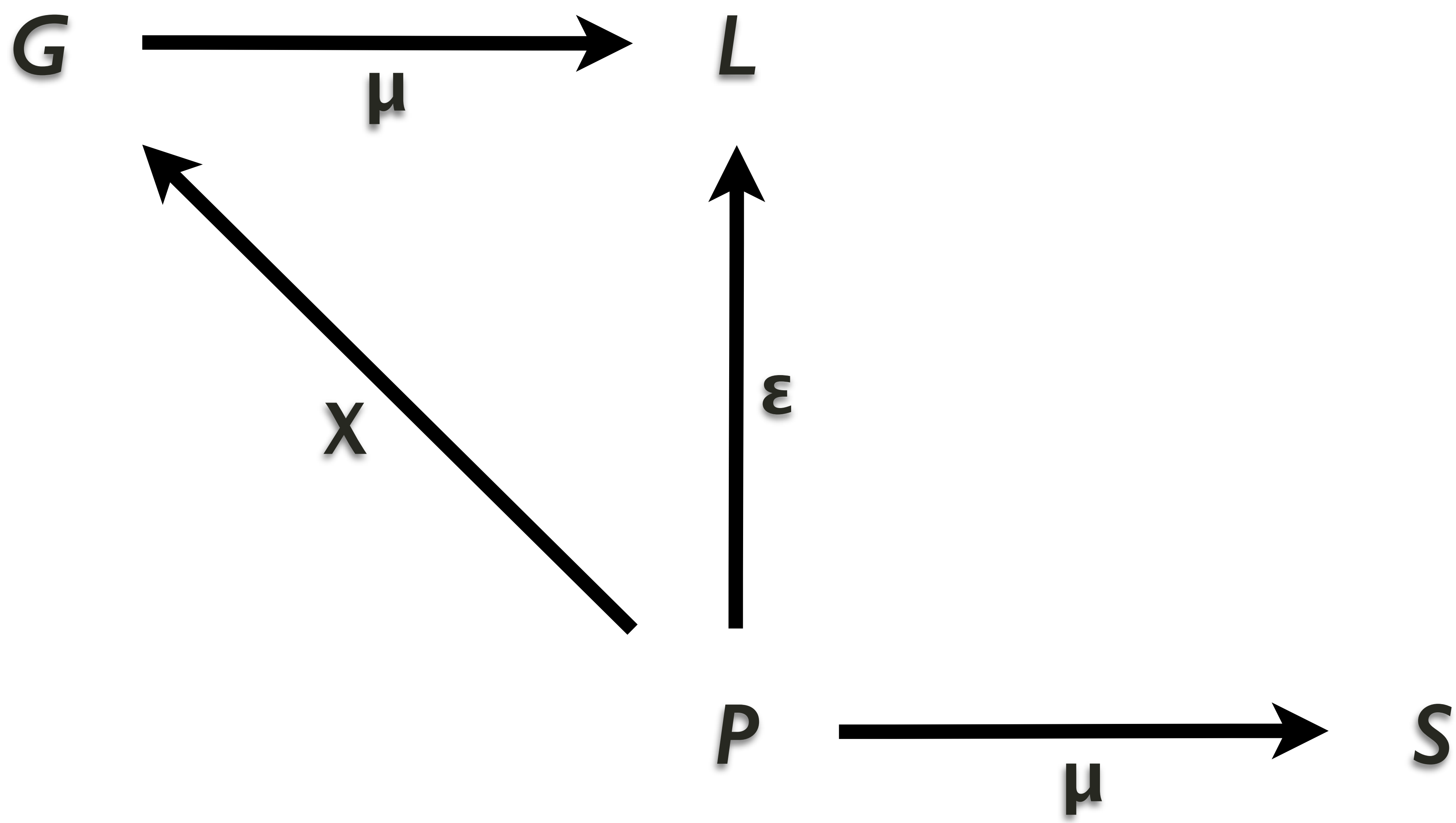
(c)

V.Zaytsev, Coupled Transformations of Boolean Grammars and Shared Packed Parse Forests. GCM 2015

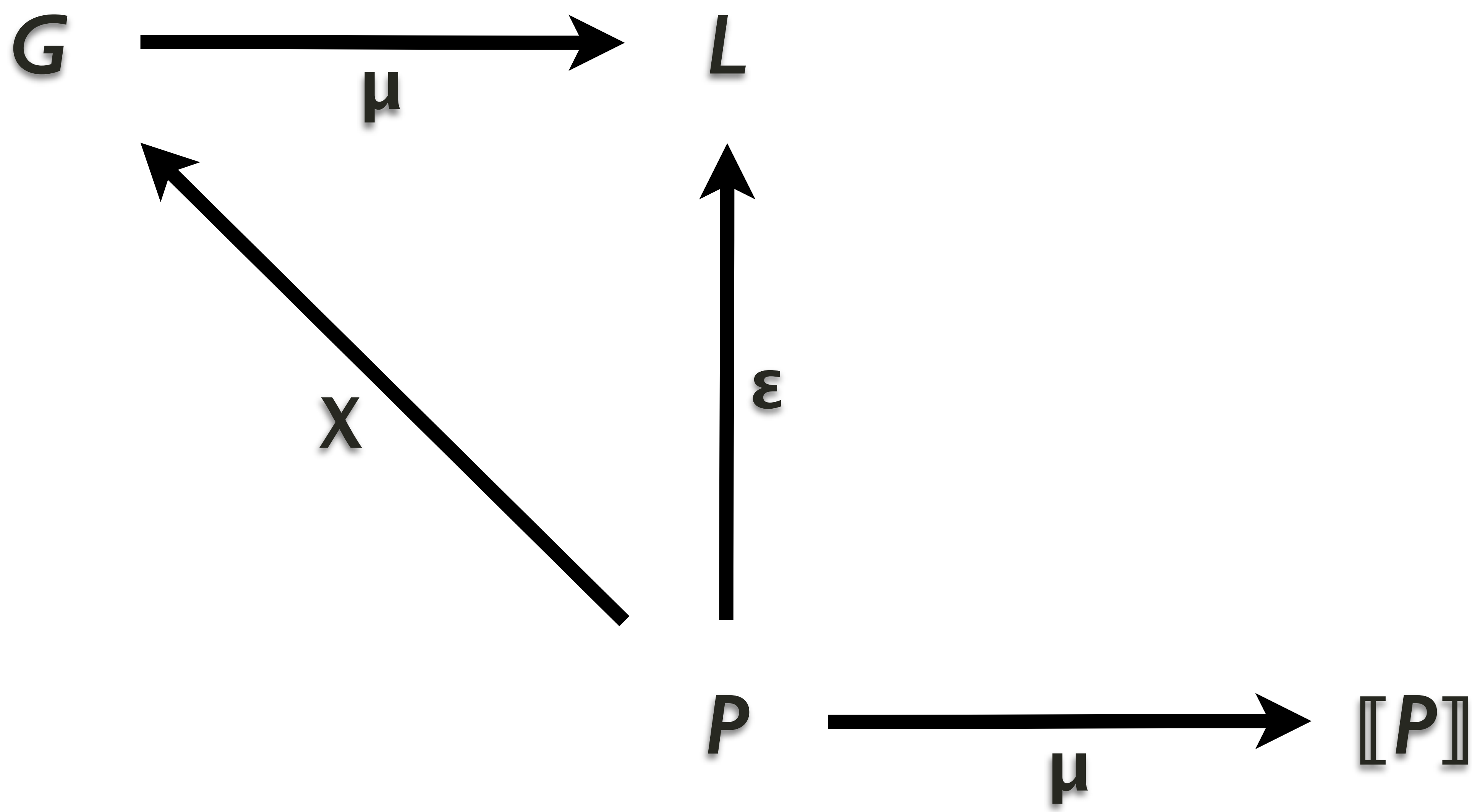
Motivation

- Software languages
- Complex systems
- Different approaches
- Megamodelling

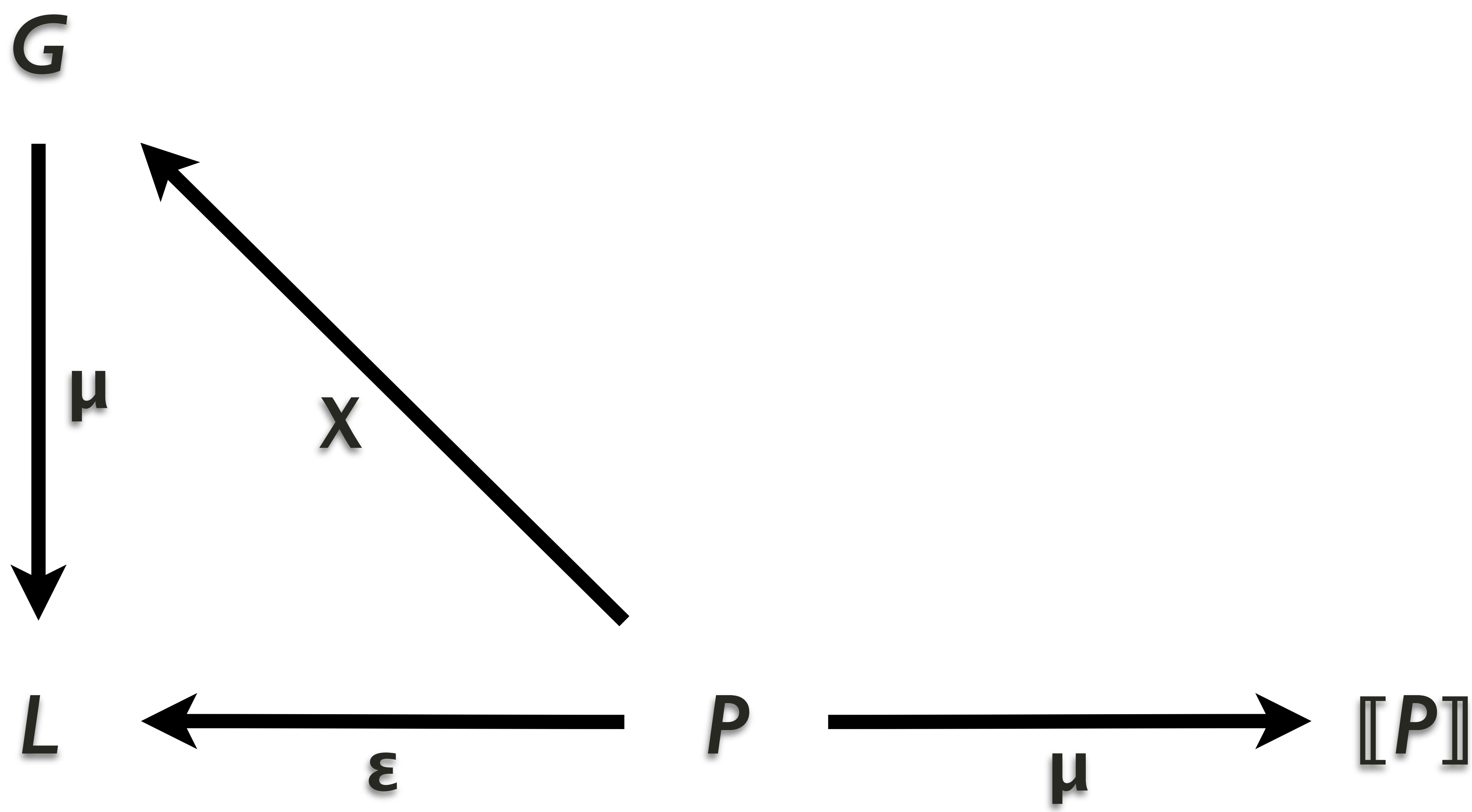
Language Theory



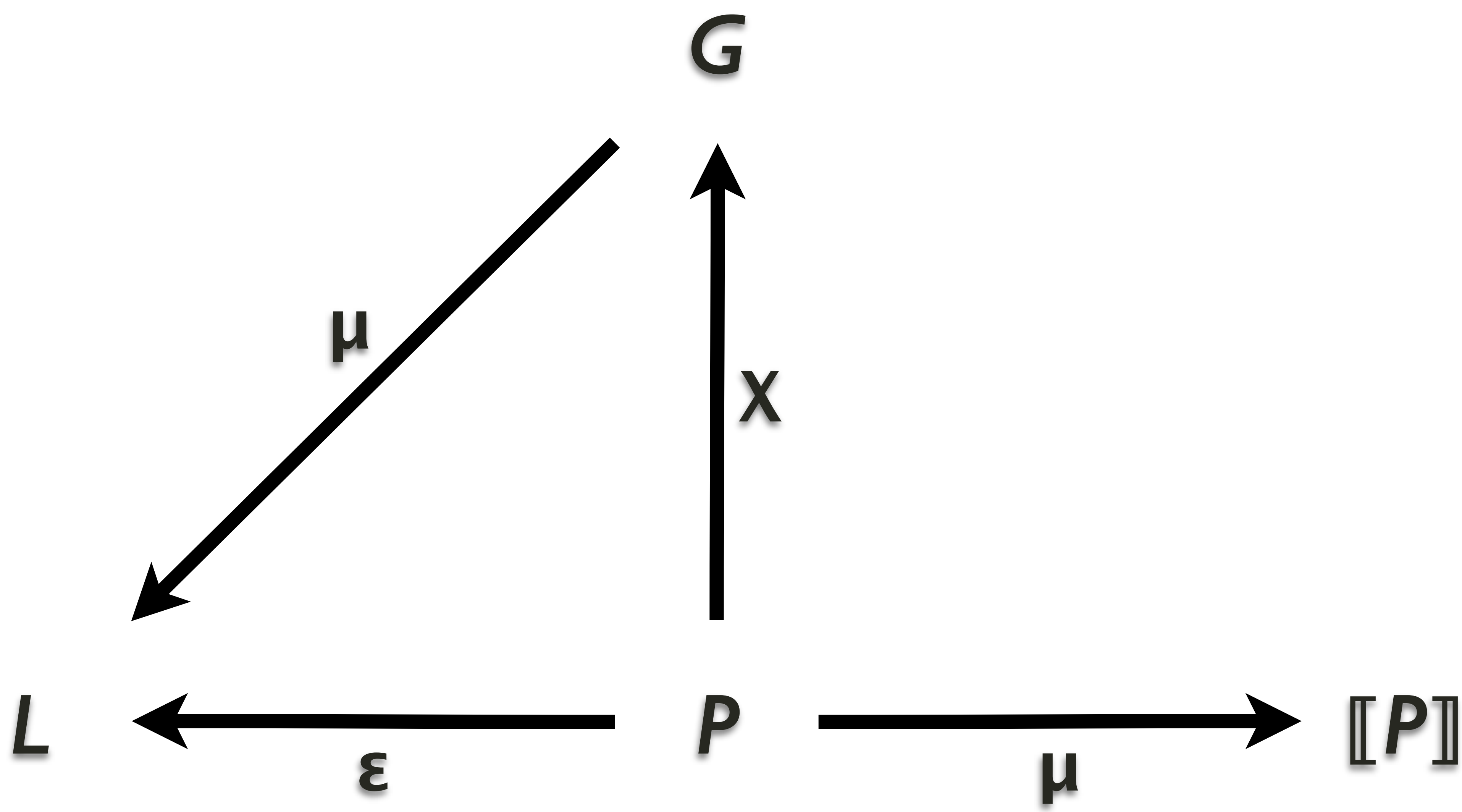
Language Theory



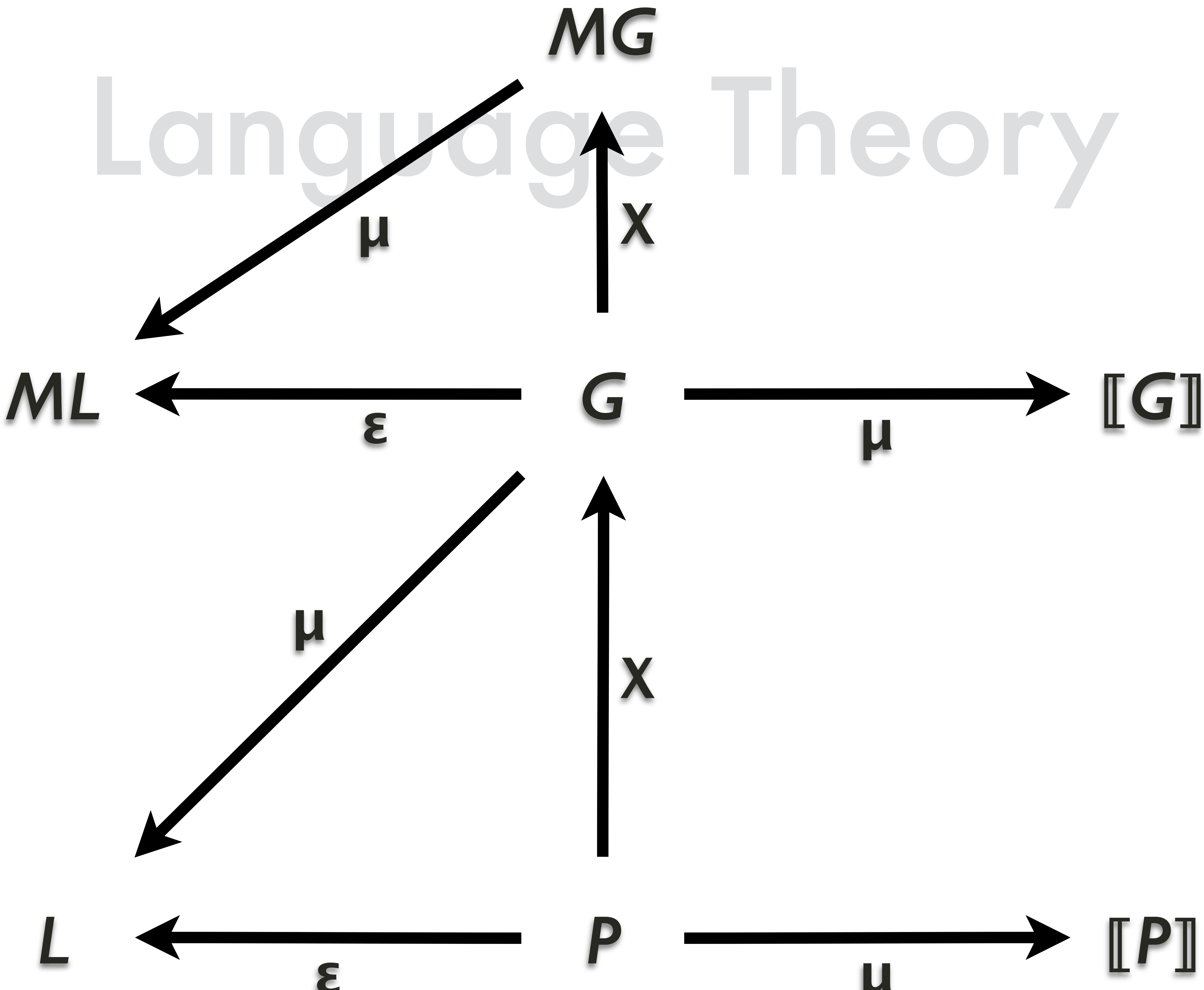
Language Theory



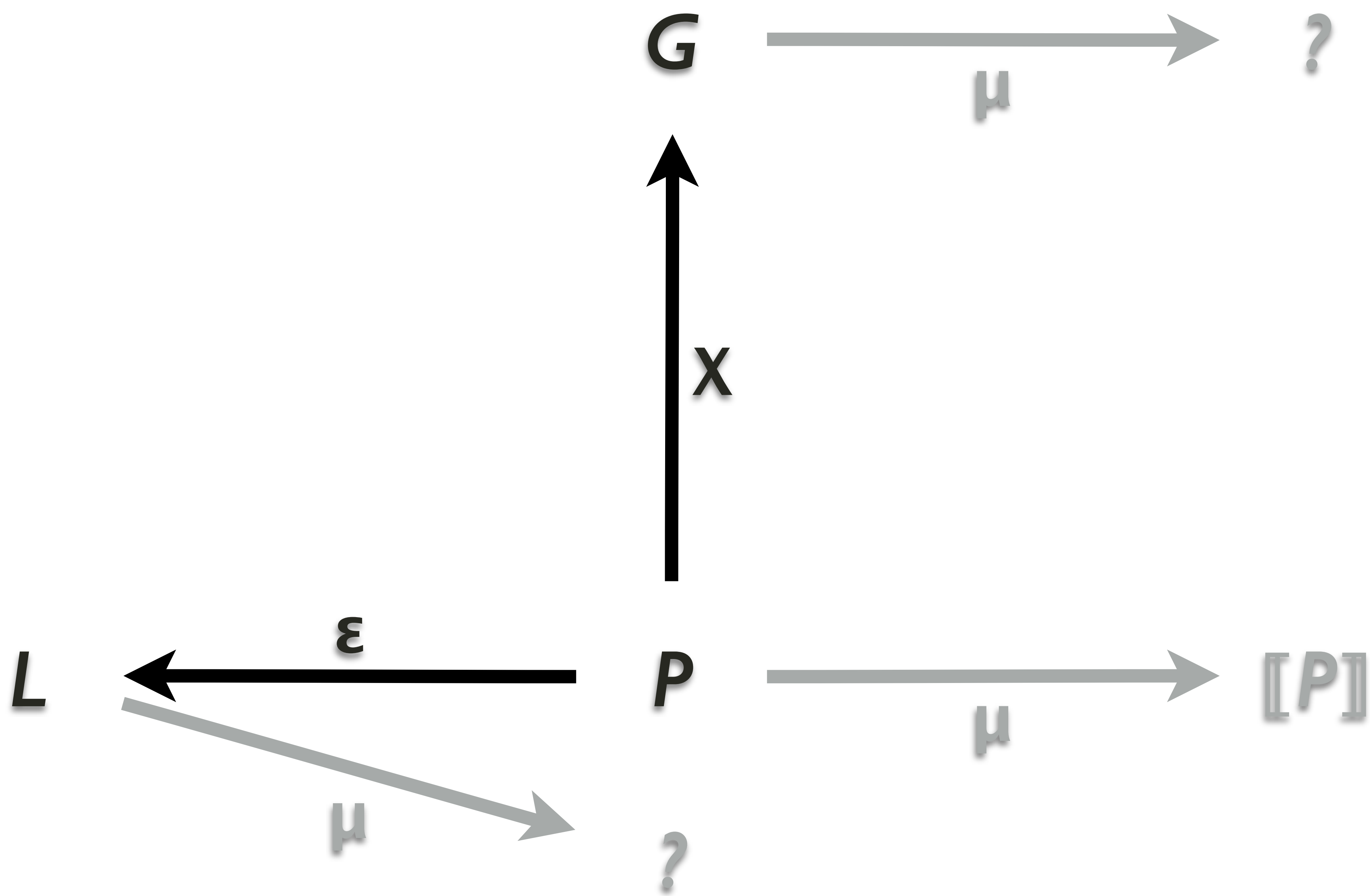
Language Theory



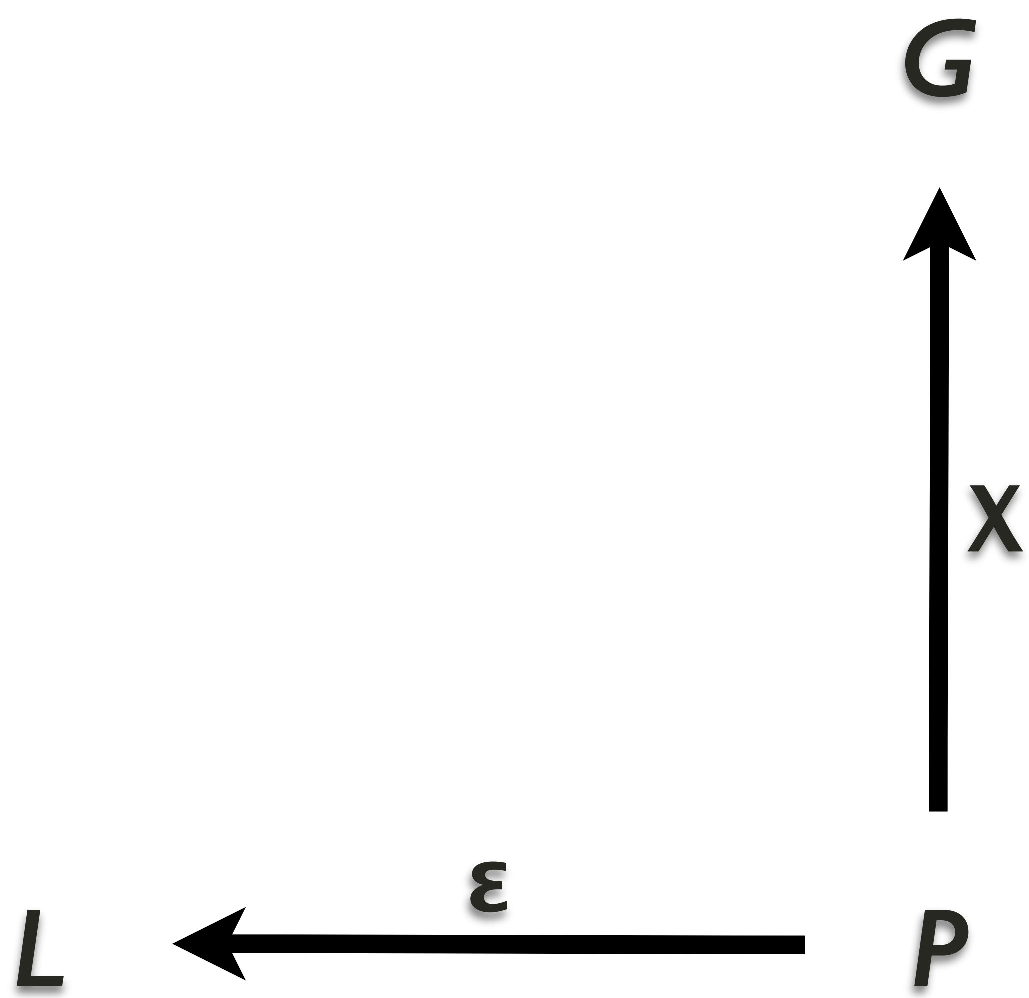
Language Theory



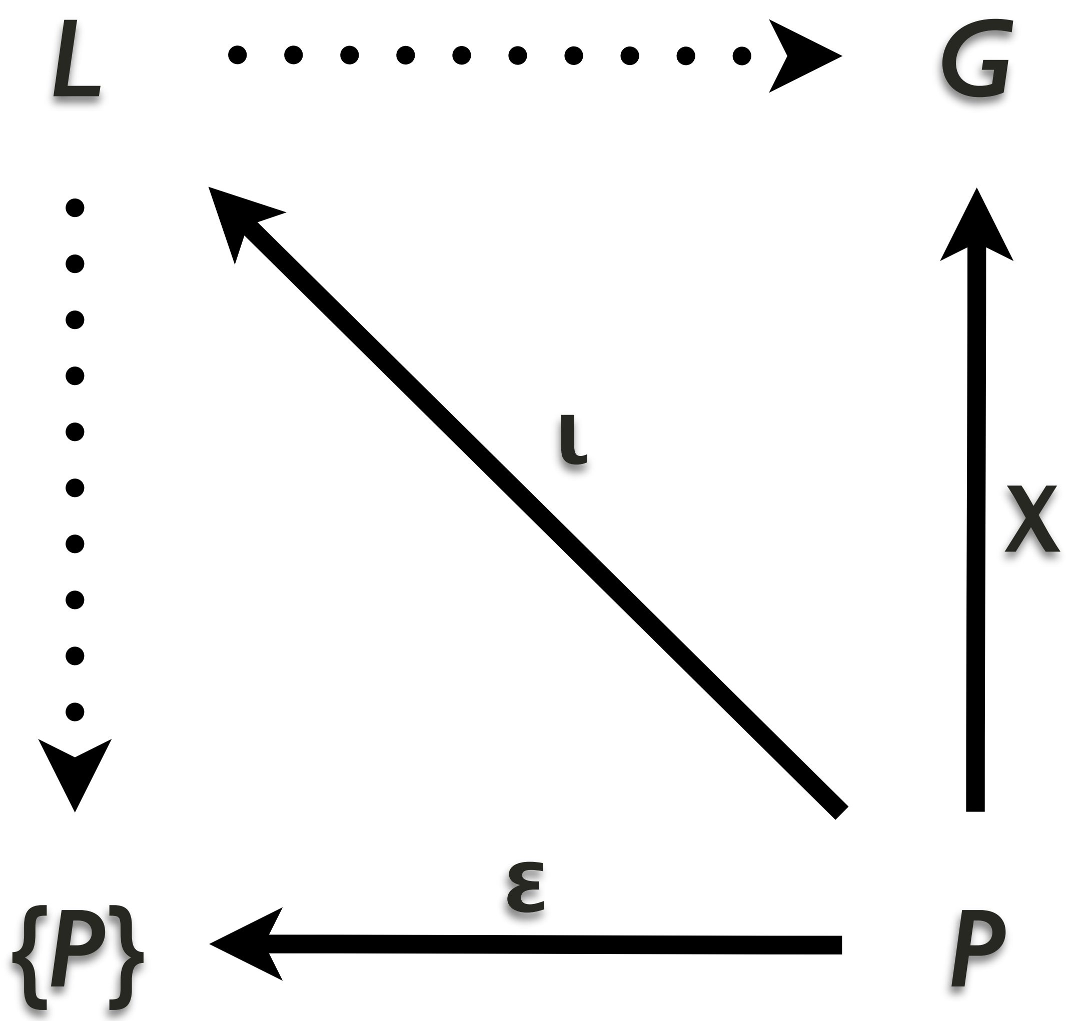
Language Theory



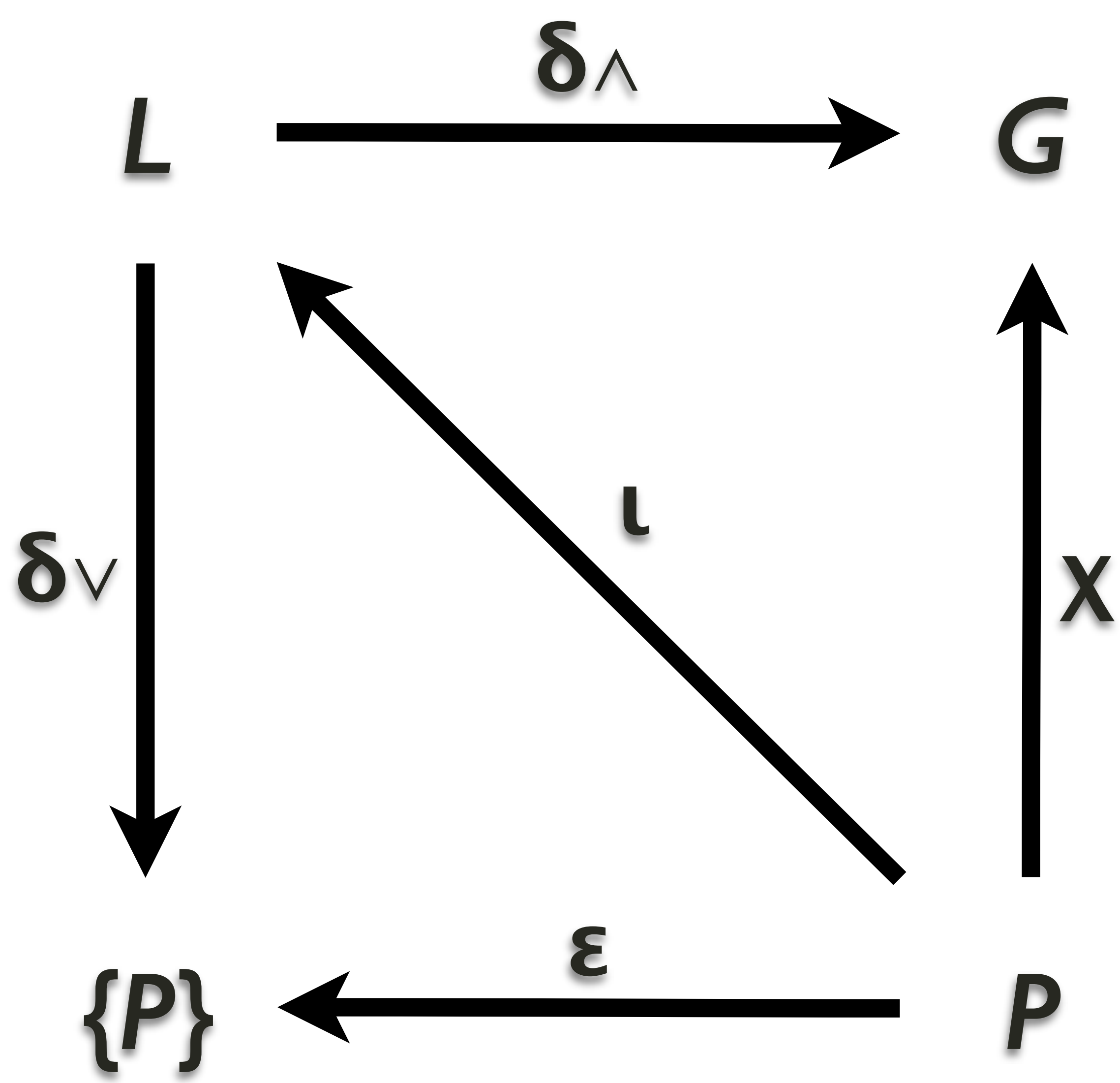
Language Theory



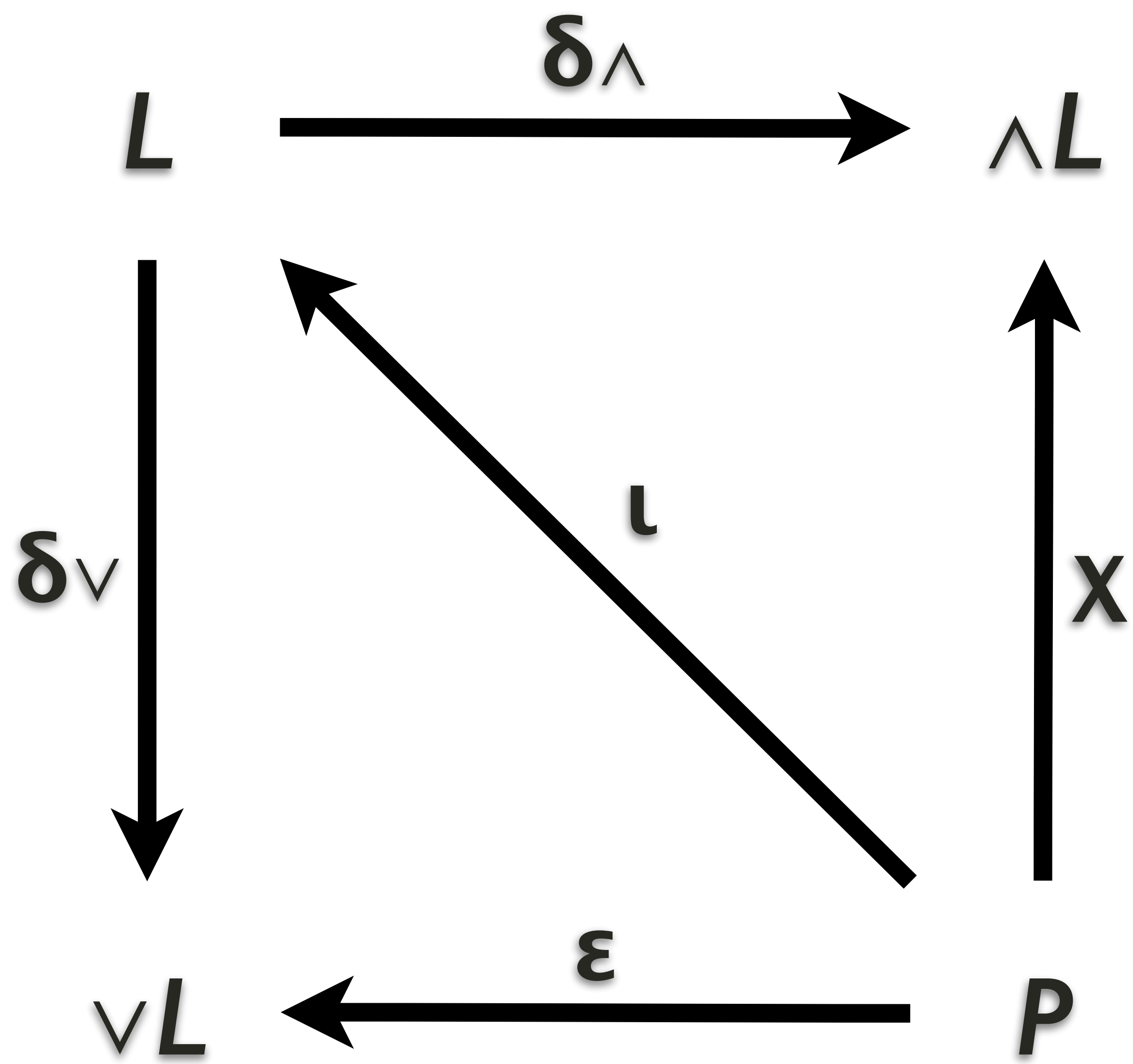
Language Theory



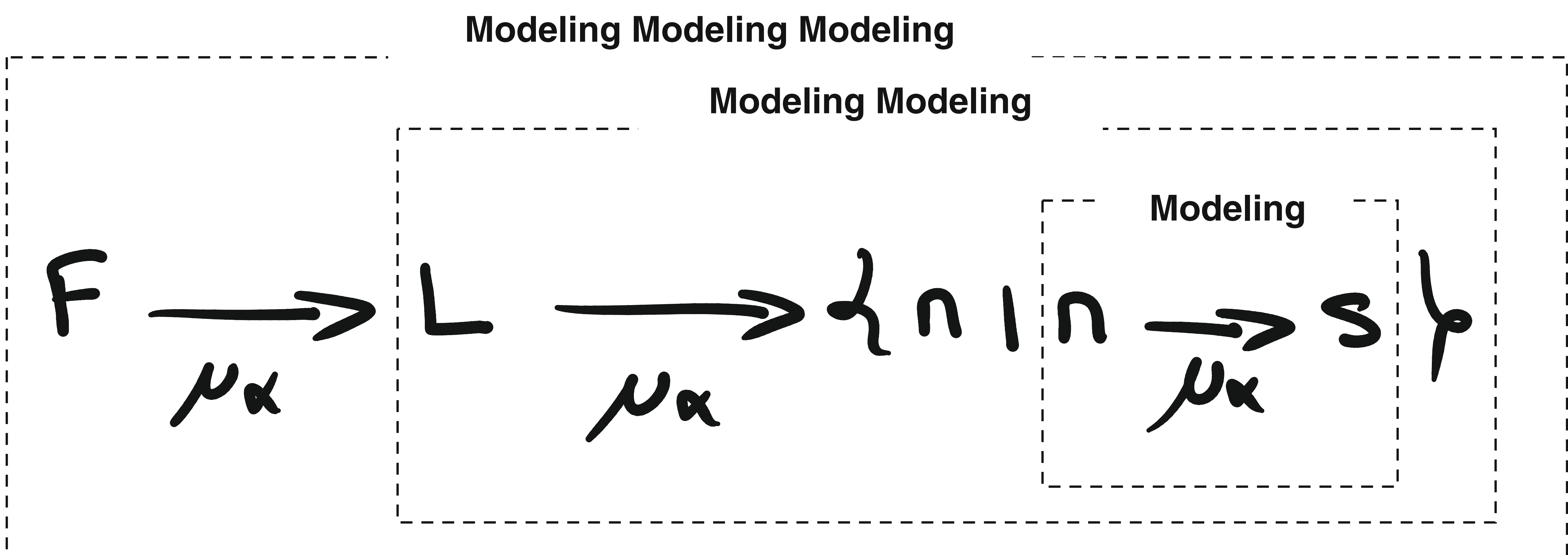
Language Theory



Language Theory

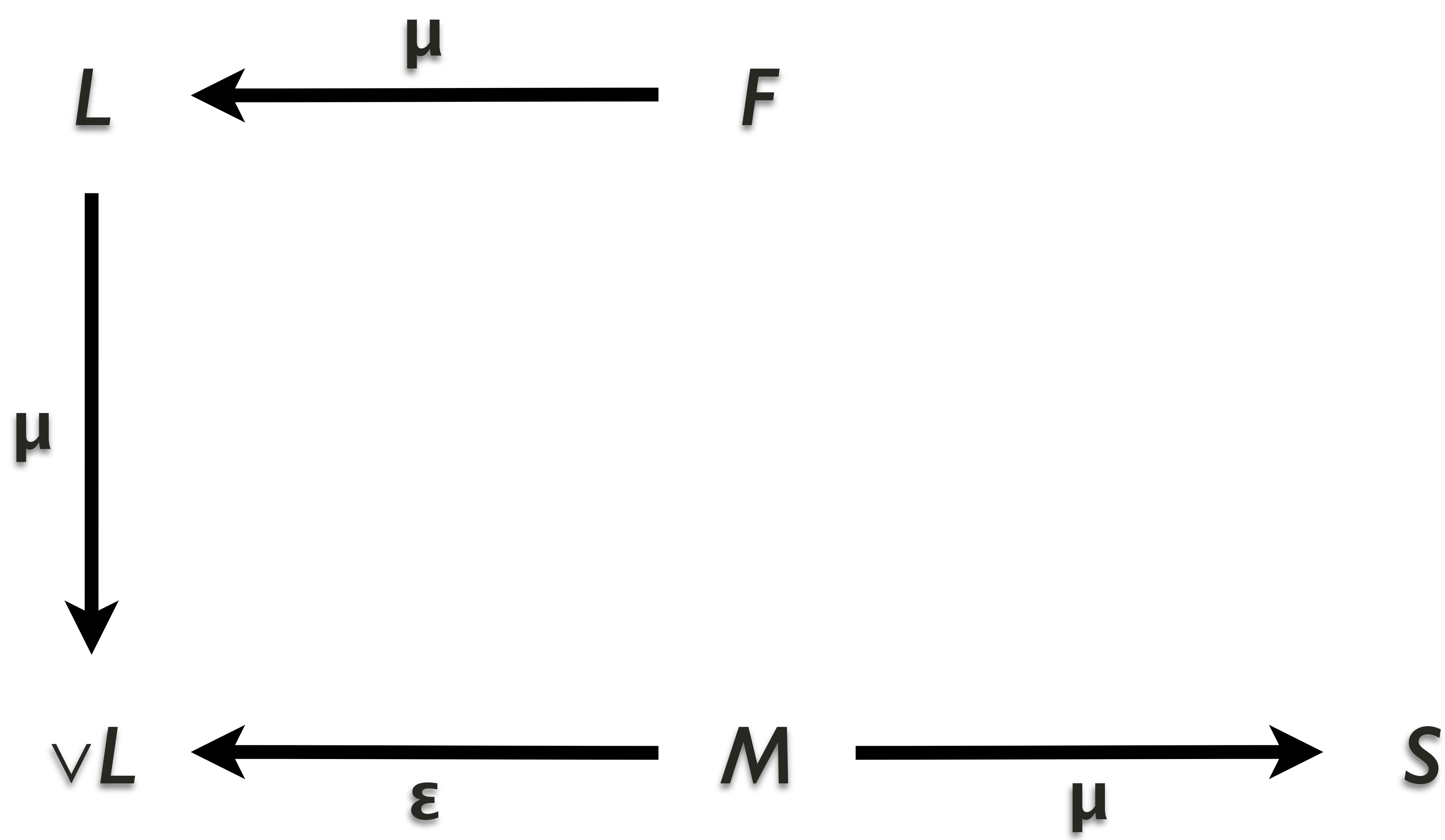


(Modelling Modelling)

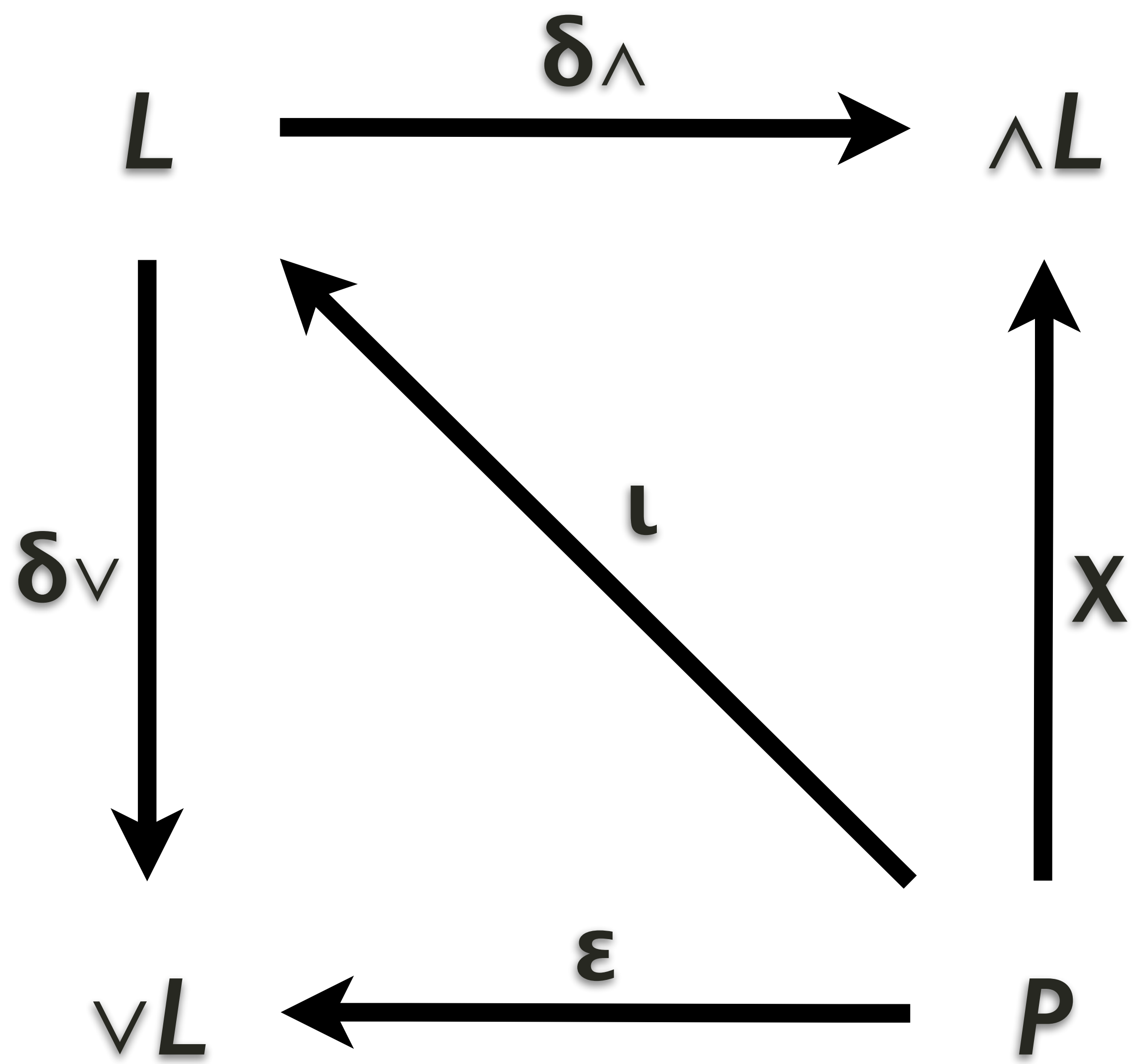


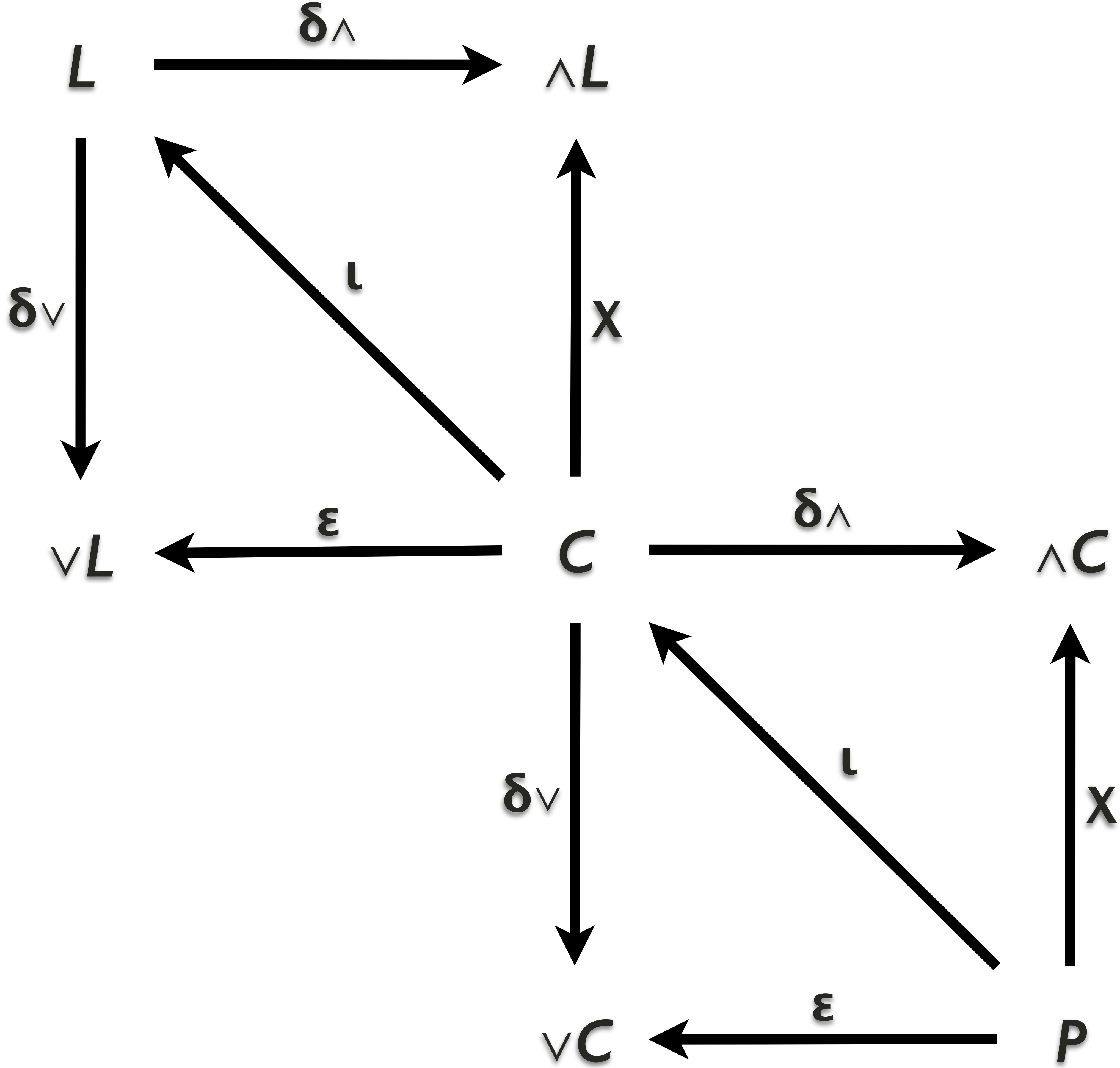
Muller, Fondement, Baudry, Combemale, Modeling Modeling Modeling, SoSyM, 2010.

(Modelling Modelling)



Back to Languages





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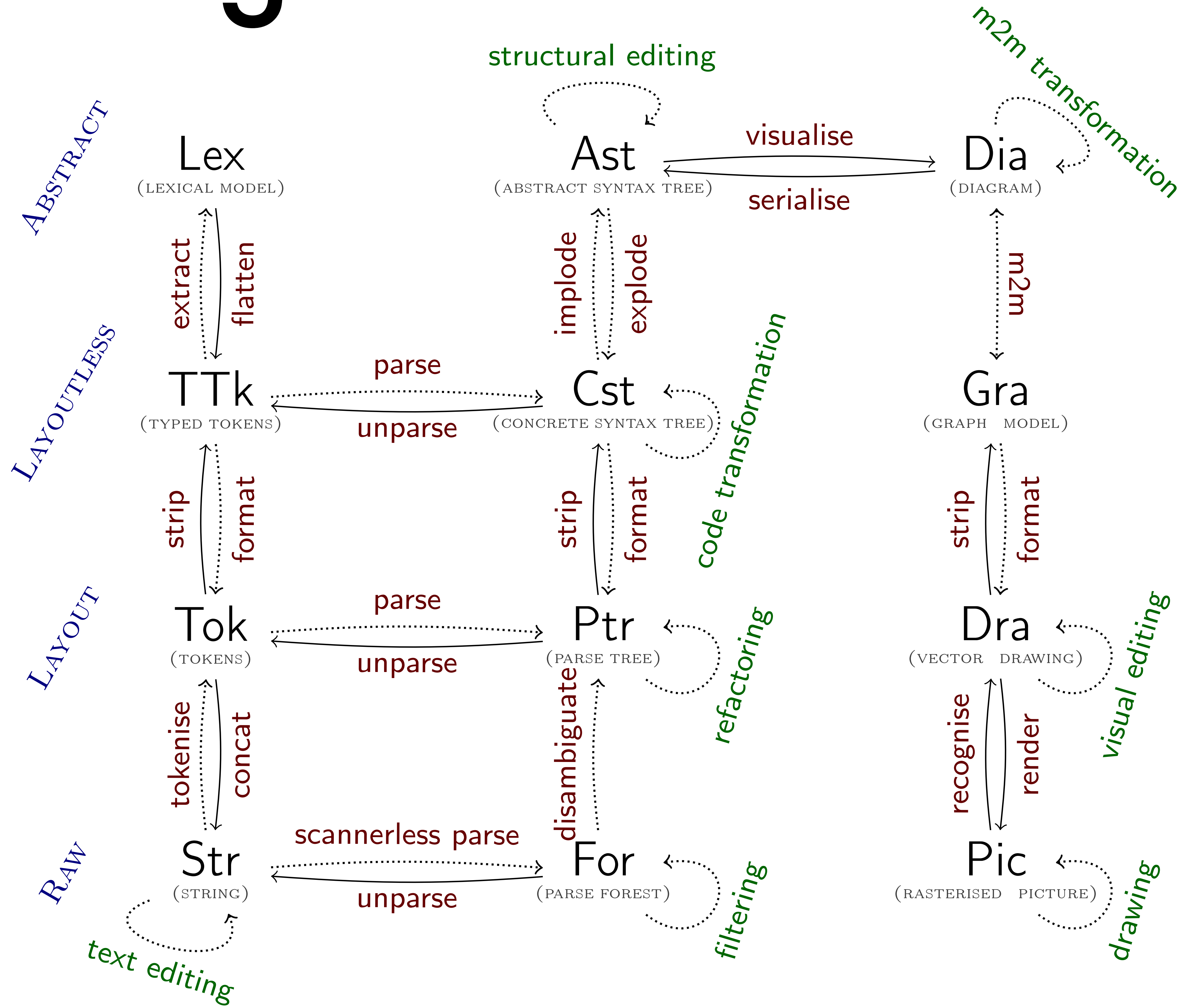
The Rôle of Grammar

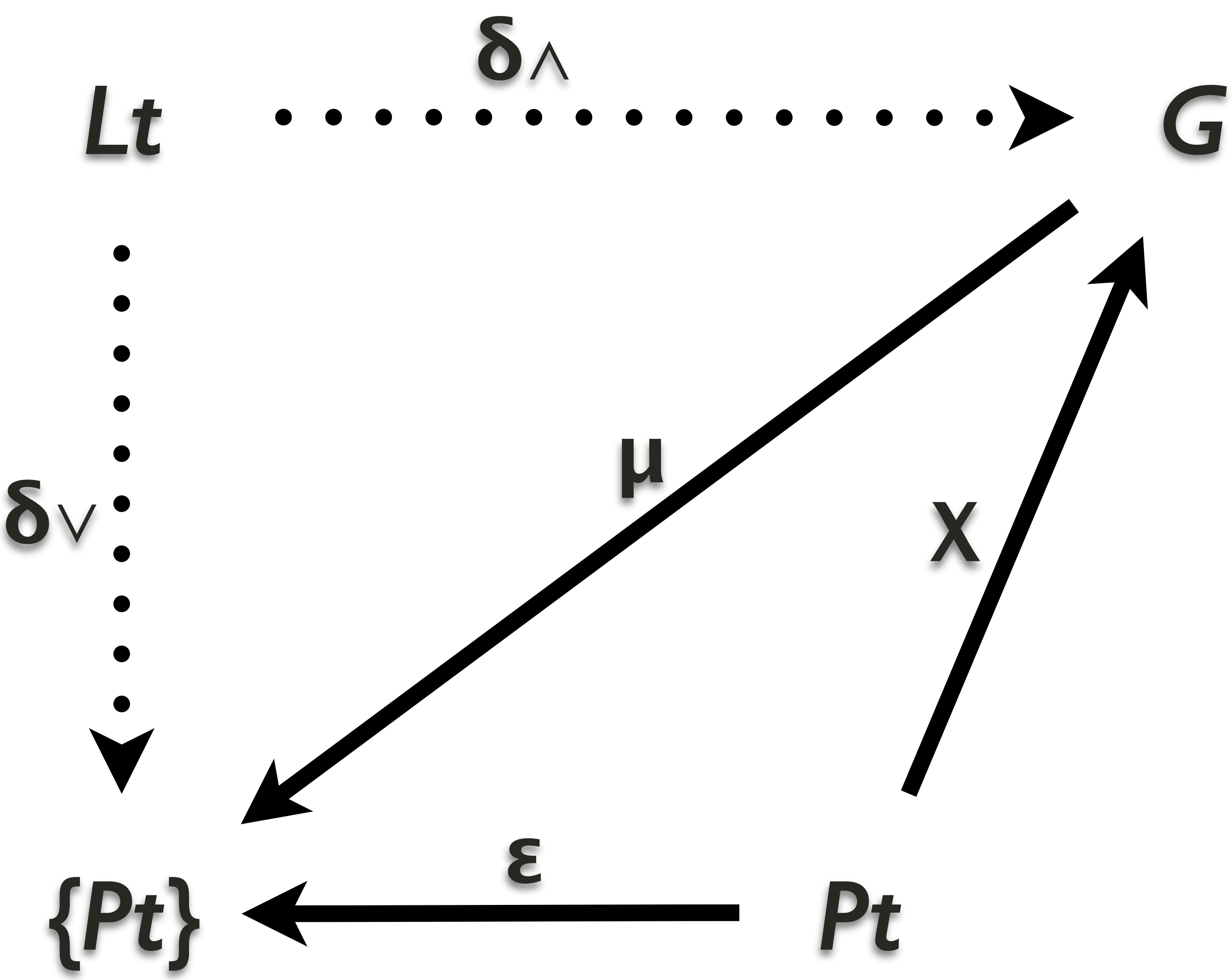
- $G \overset{\mu}{\rightsquigarrow} \wedge L$ (analytical/prescriptive/conformance)
- $G \overset{\mu}{\rightsquigarrow} L$ (commitment)
- $G \overset{\mu}{\rightsquigarrow} \vee L$ (generative/derivational)
- $G \overset{\mu}{\rightsquigarrow} \pi$ (transformational/mapping)
- $G \overset{\mu}{\rightsquigarrow} \kappa$ (same but "downwards")

Parsing in a Broad Sense

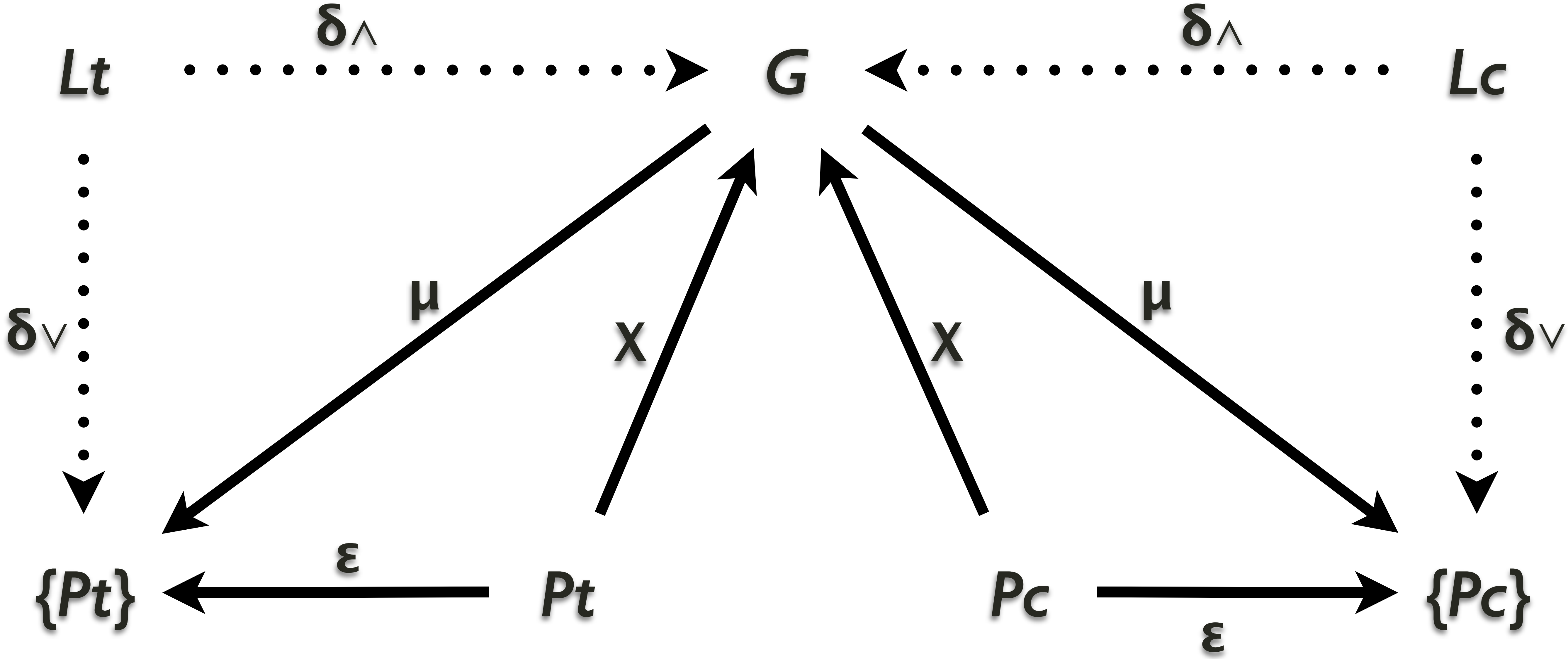


V.Zaytsev, A.H.Bagge, Parsing in a Broad Sense, MoDELS 2014.

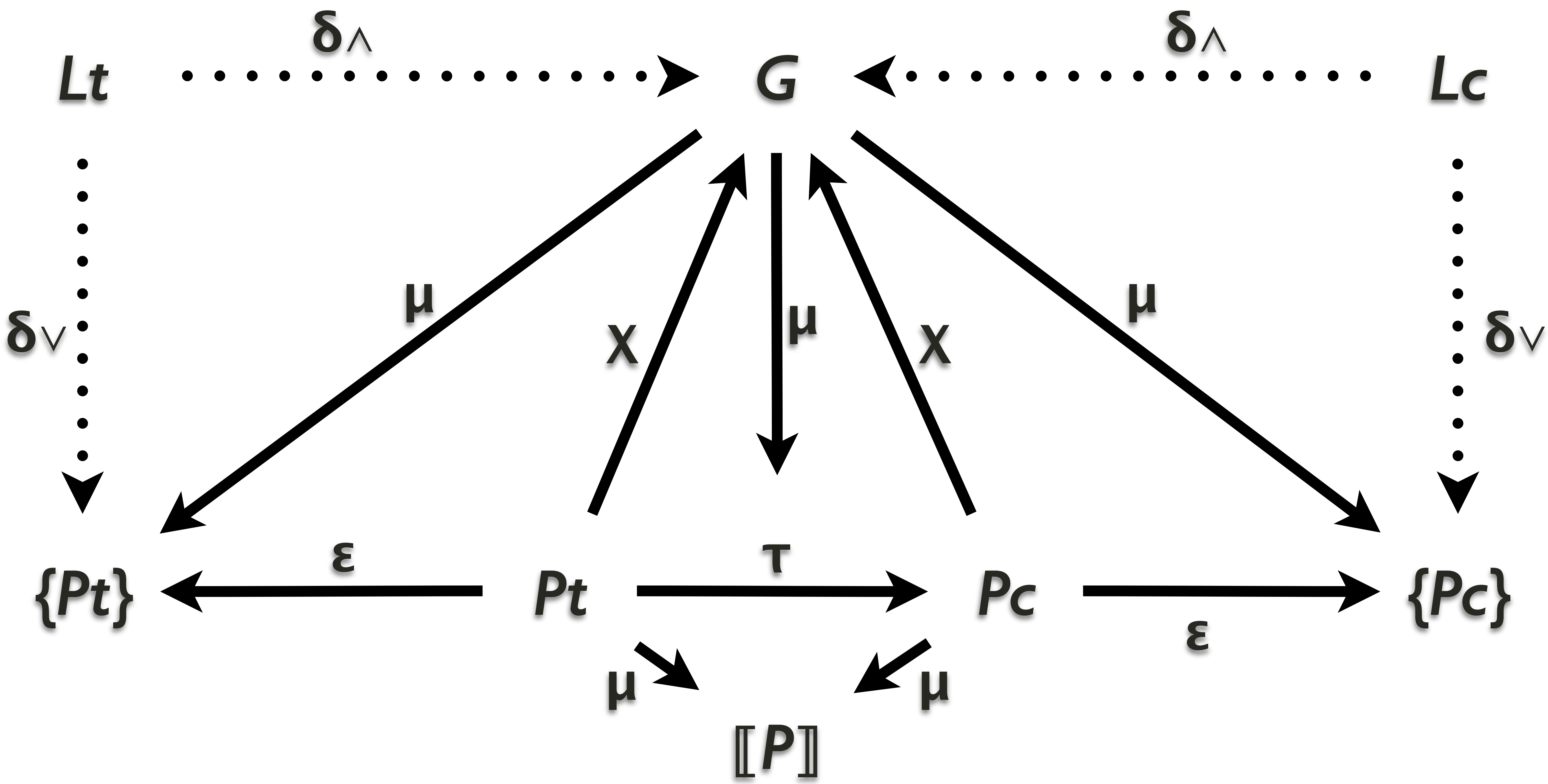
Parsing

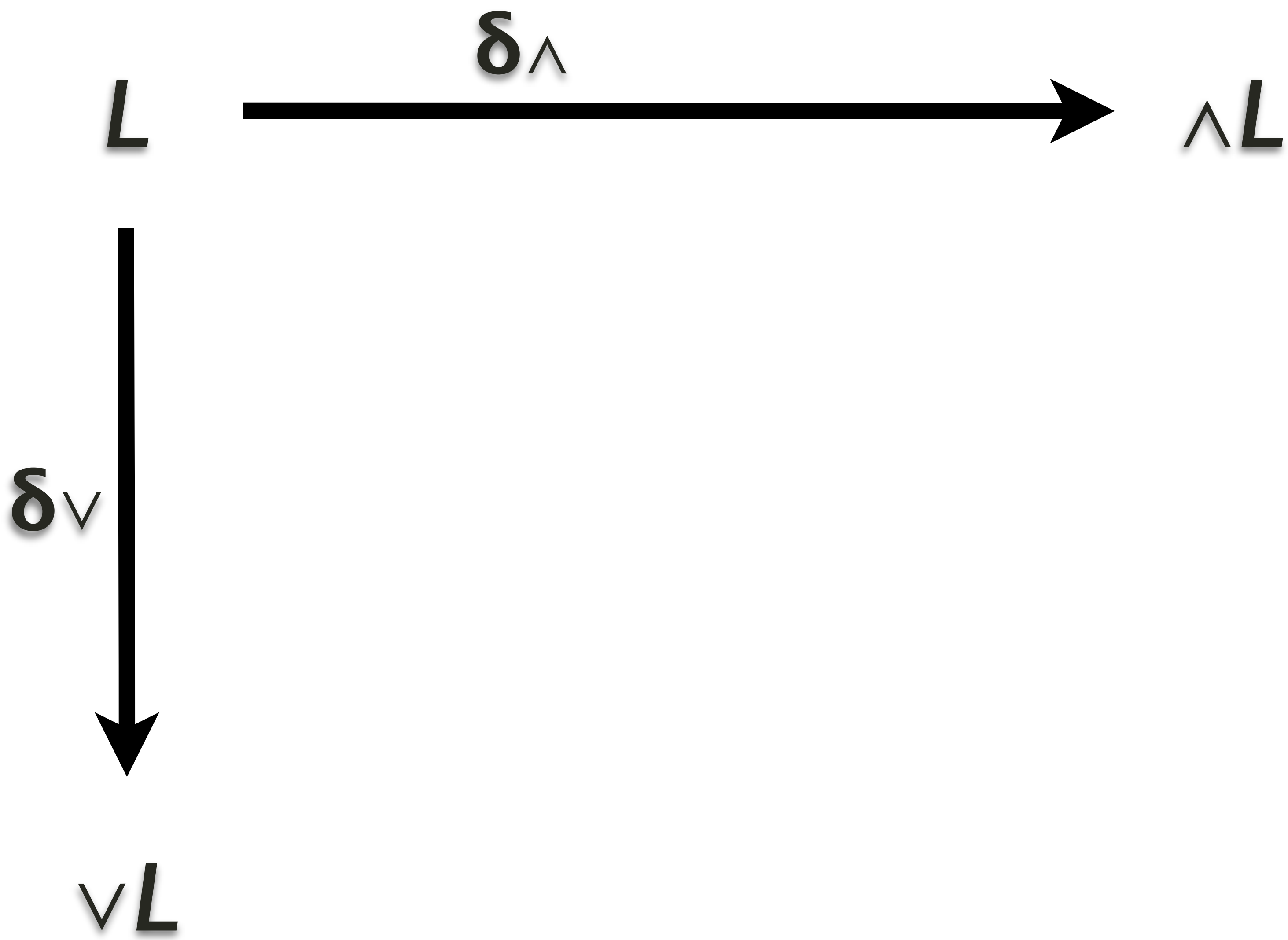


Parsing

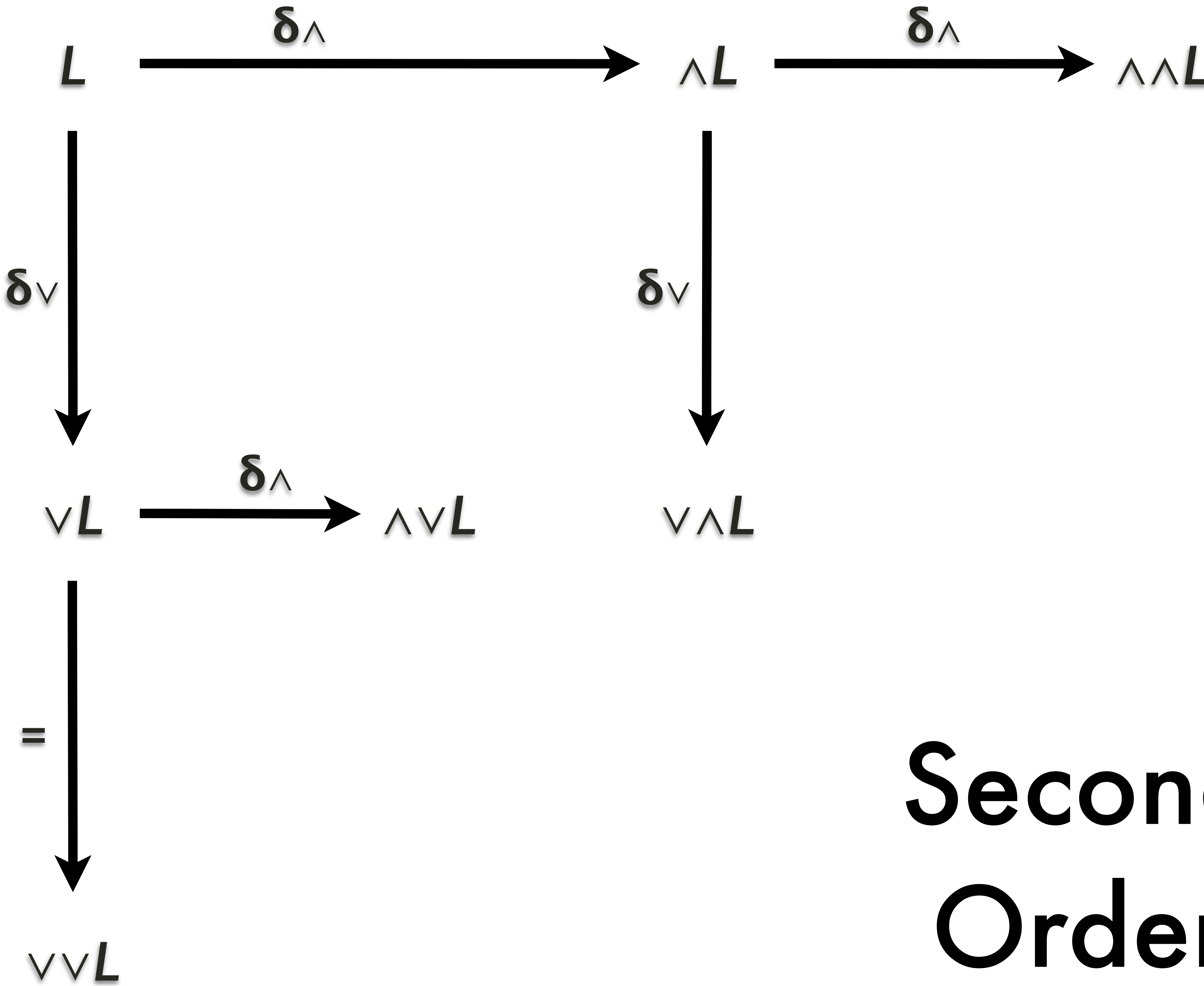


Parsing

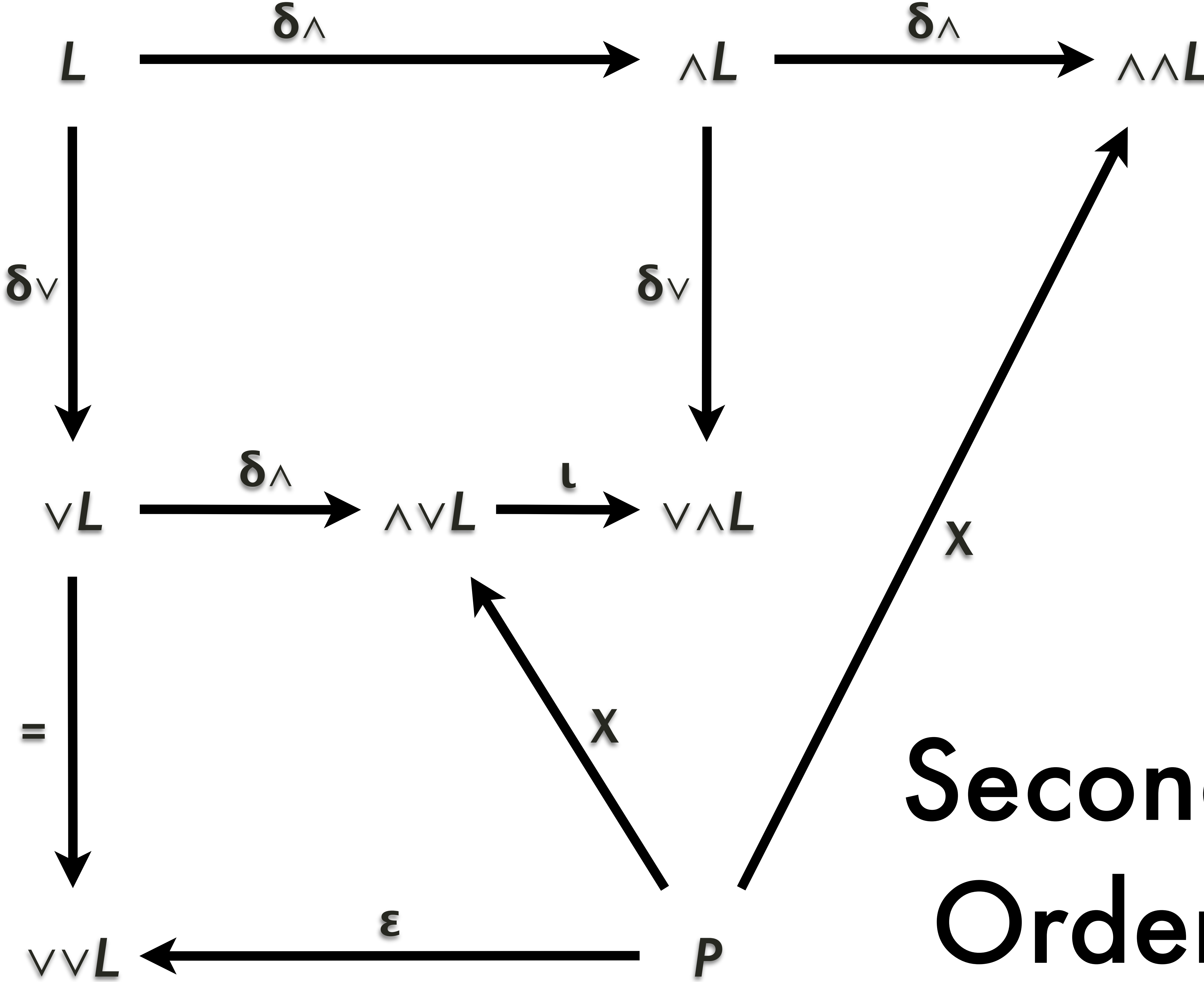




First Order



Second Order



Second Order