

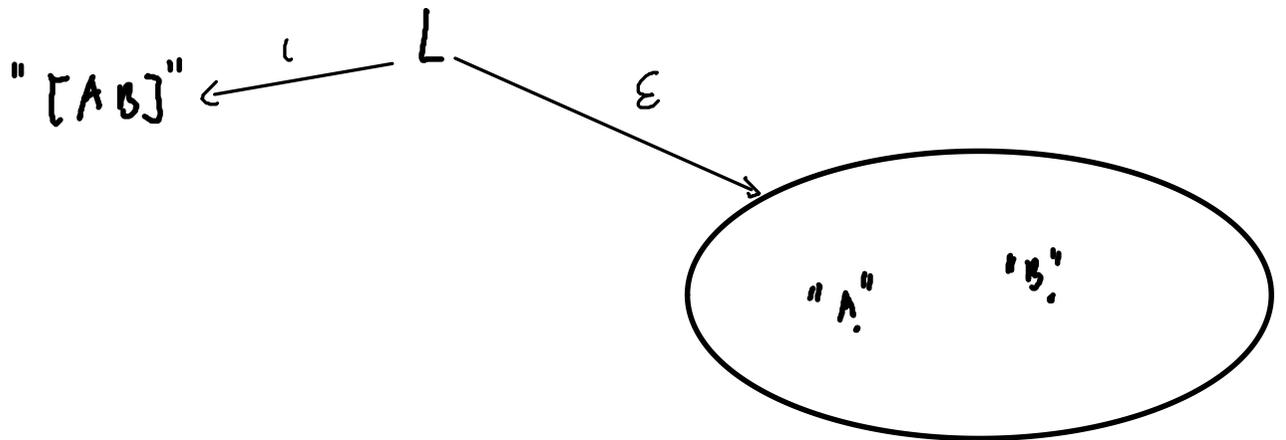
$$\llbracket "A+B*" \rrbracket_{RE} = \{ "A", "AA", \dots, "AB", "AAB", \dots \}$$

$$\llbracket "[AB]" \rrbracket_{RE} = \{ "A", "B" \}$$

"intension"

LANGUAGE L

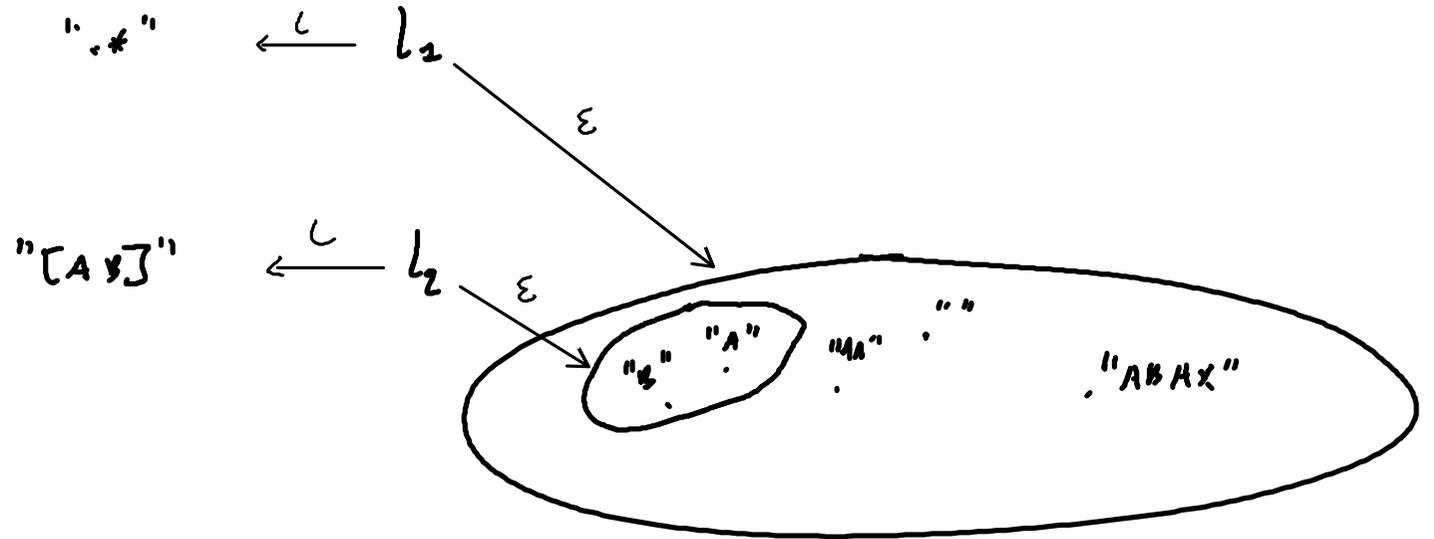
"extension"



•  $\epsilon$  ANY CHAR FROM ALPHABET

$$L_1 = ".*" \quad \epsilon(L_1) = \{ "", "A", "AA", \dots \}$$

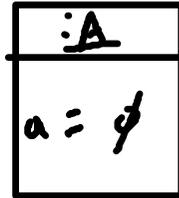
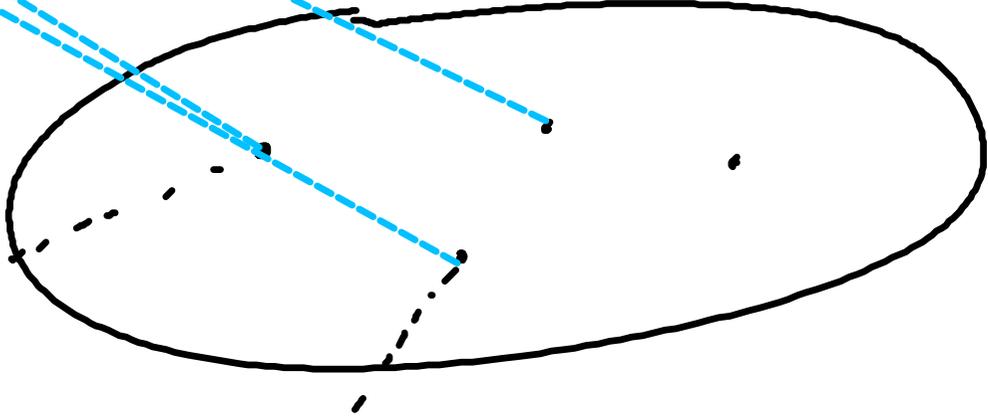
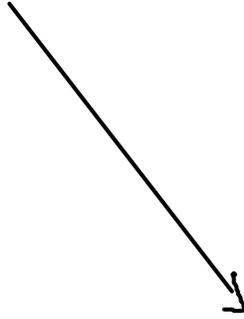
$$L_2 = "[AB]" \quad \epsilon(L_2) = \{ "A", "B" \}$$

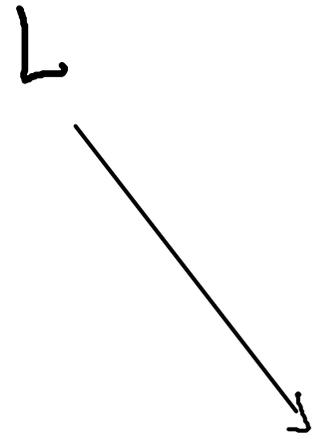
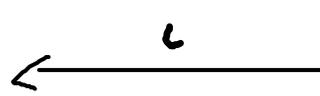
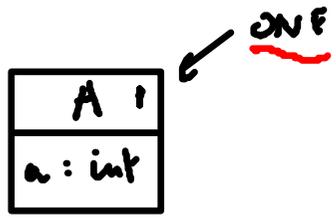


$$L_1 \cap L_2 \subseteq L_1 \cap L_2 \subseteq \epsilon(L_1) \cap \epsilon(L_2)$$

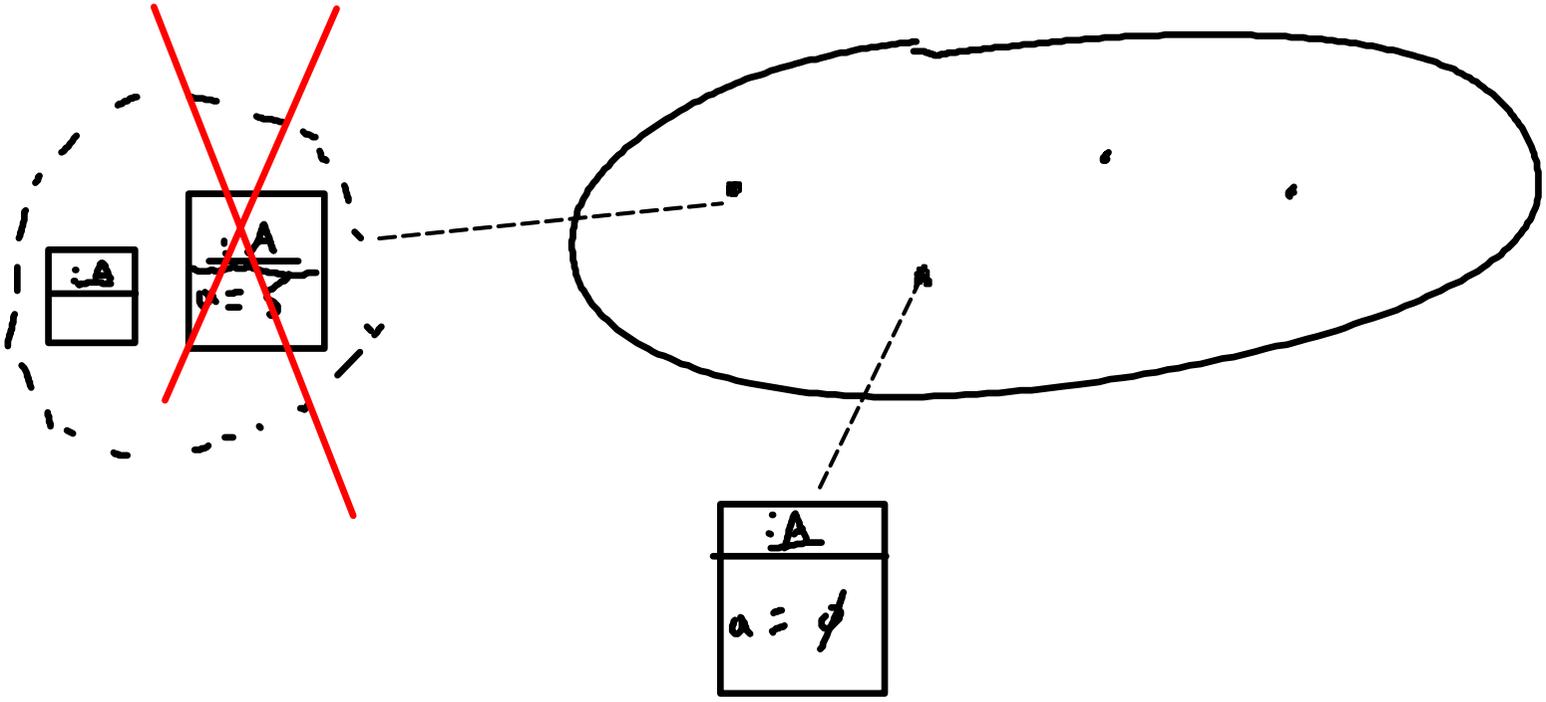


$L$

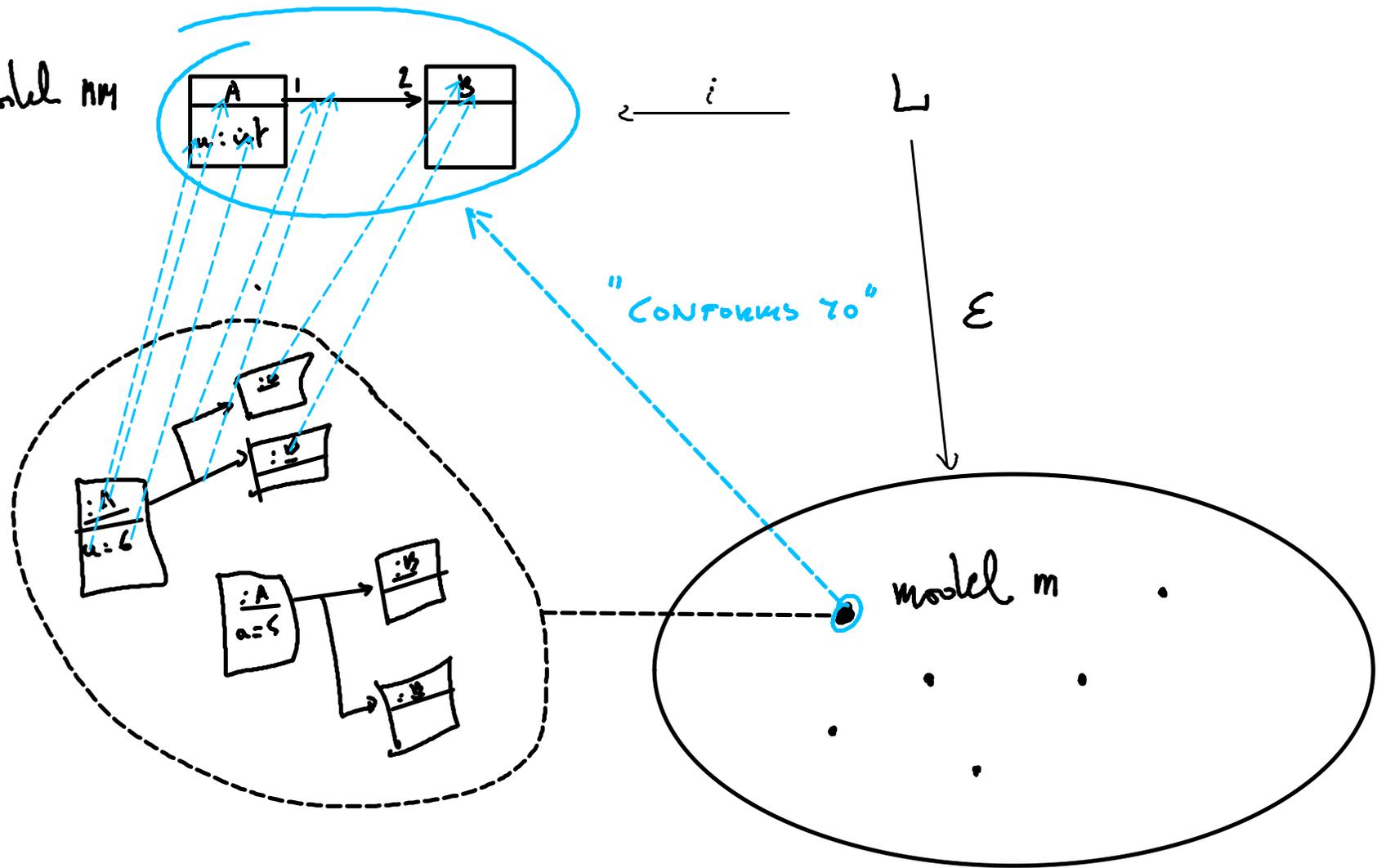




$\Sigma$



meta-model MM



$$MM = i(L)$$

$$M \text{ CONFORMS TO } MM \equiv m \in \epsilon(L)$$

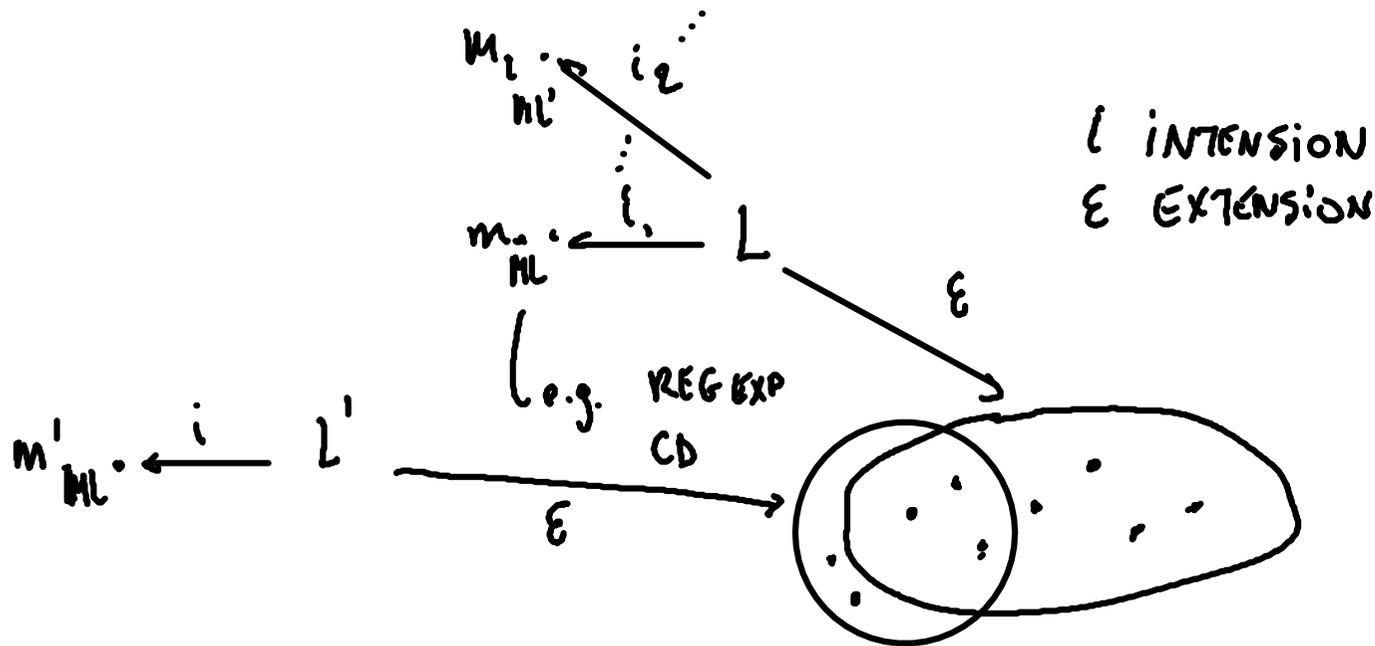
VERIFY (m, MM) = True (WITH PARTICULAR BINDING / MAPPING)

$$\mu(MM) = L$$

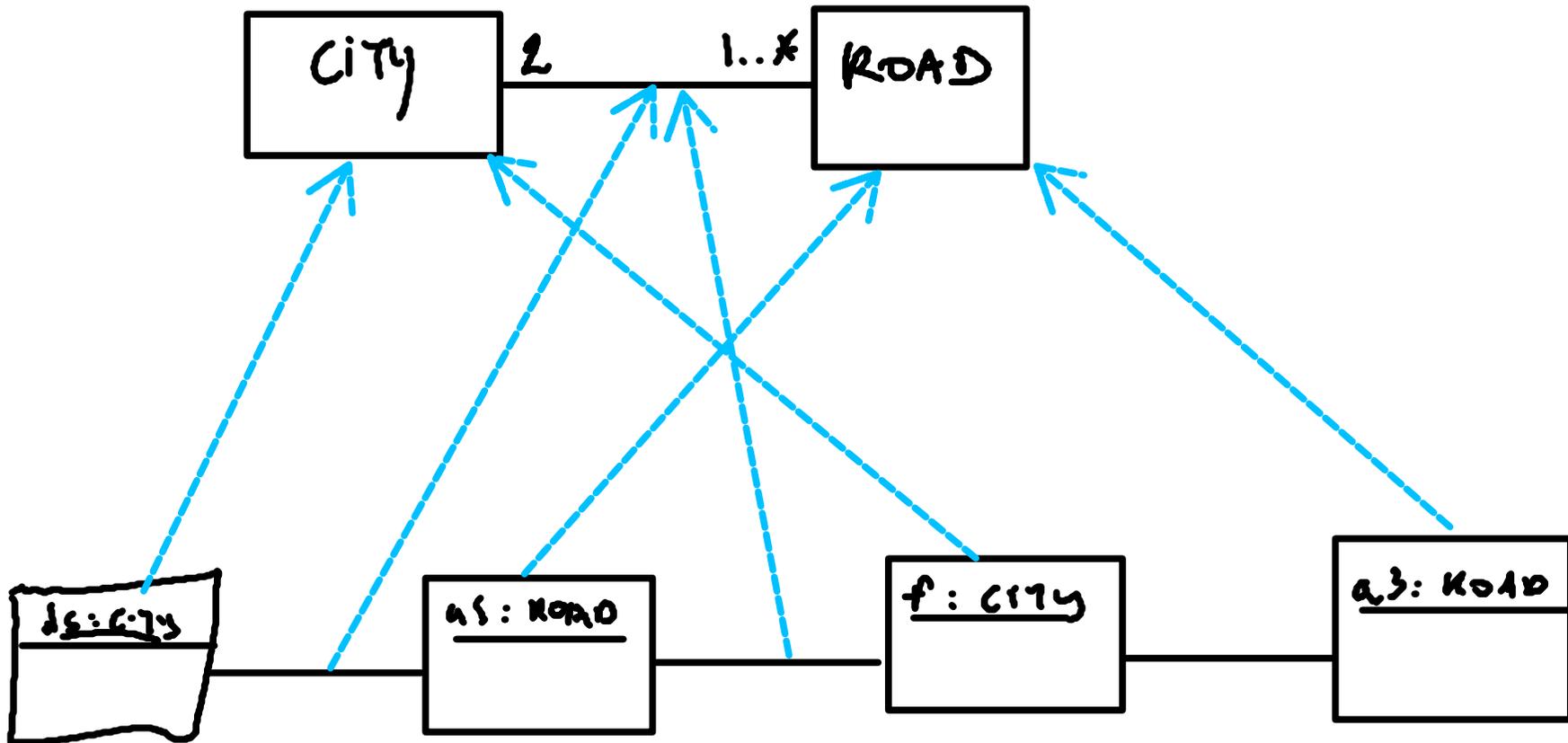
$$[MM]_{\text{CONFORM}} = \epsilon(L)$$

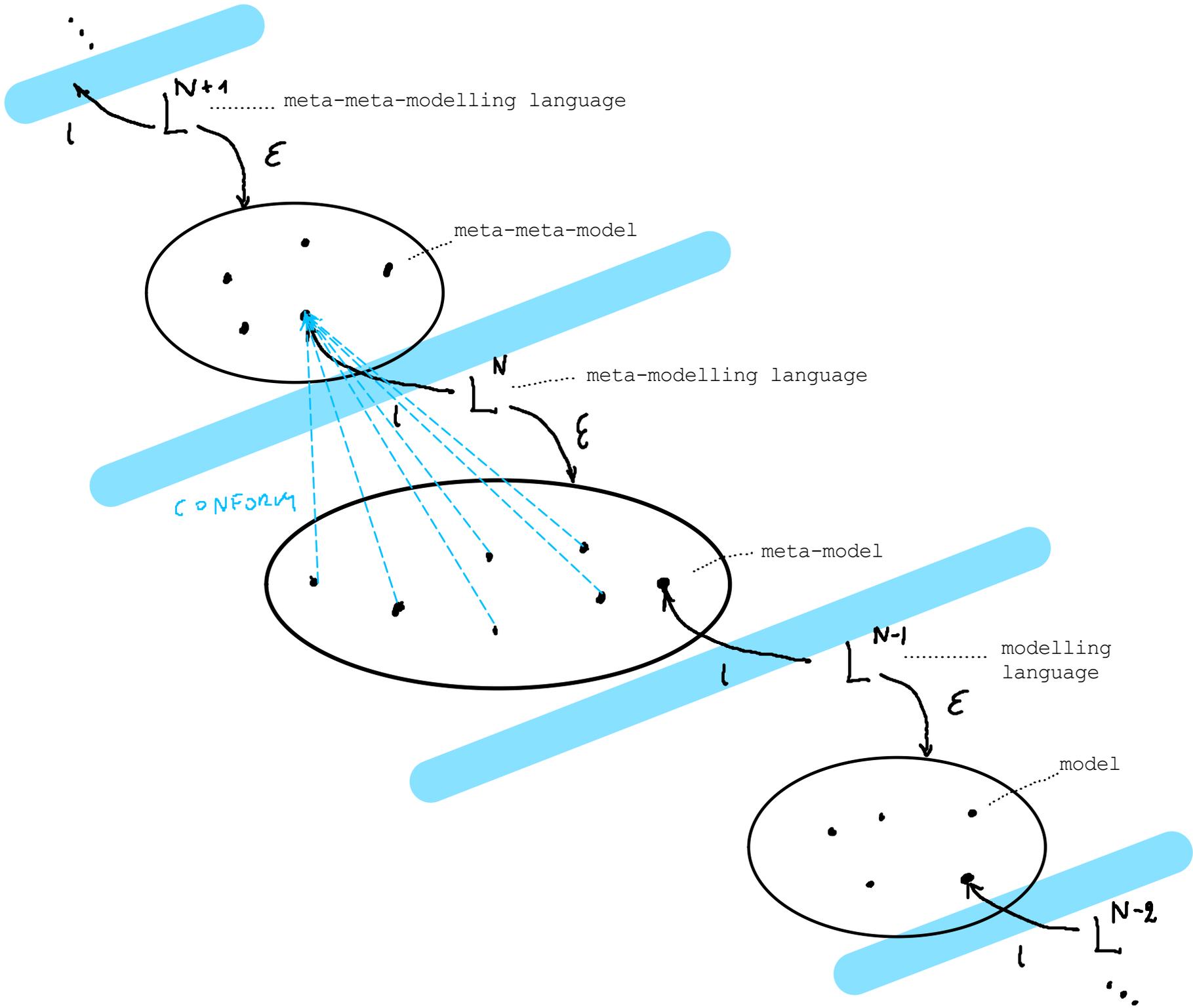
note that there may be different (types of) conforms\_to relationships:  
 name-based (also known as nominal), structure based, ...

a single language may have multiple intensional descriptions



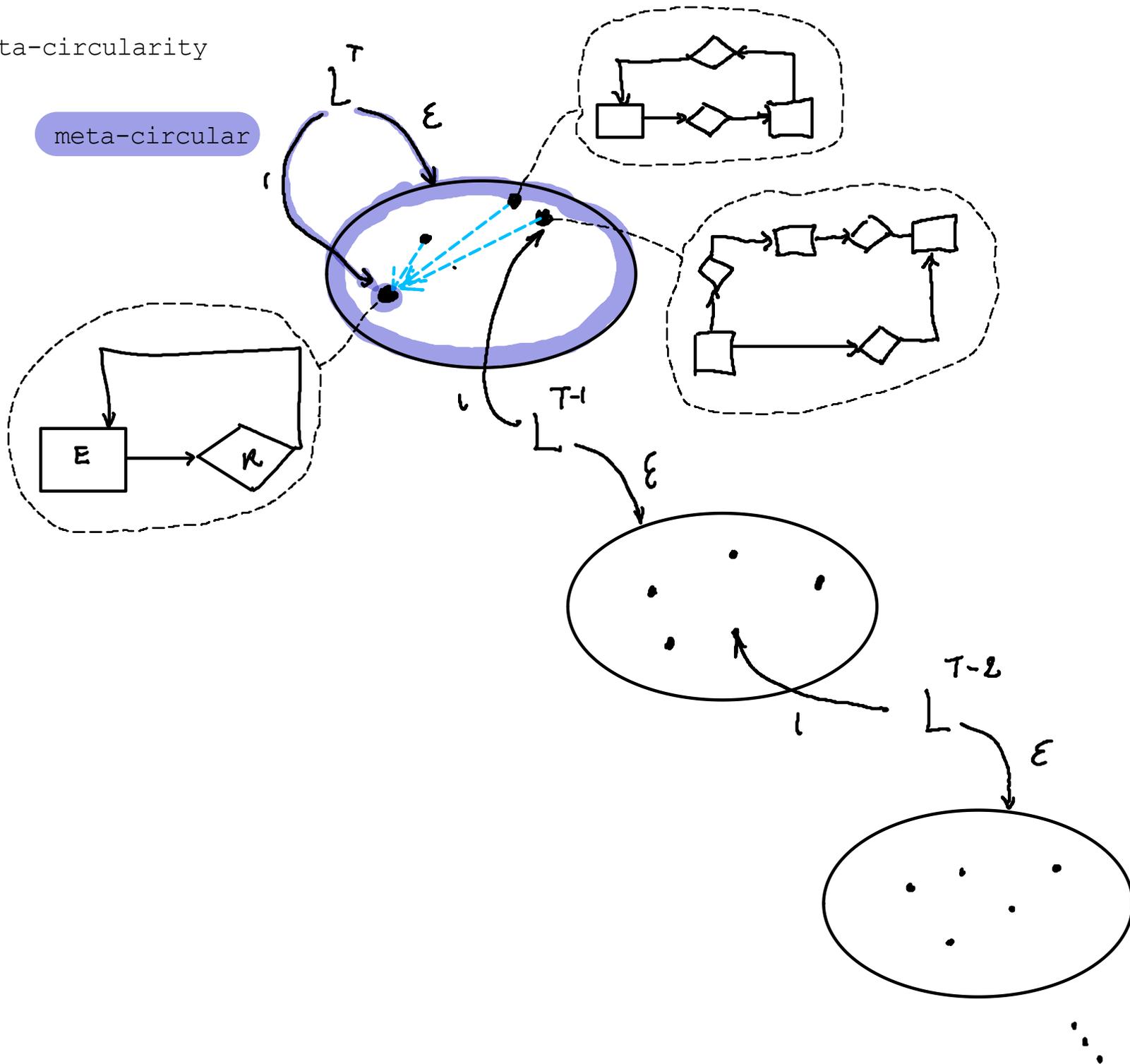
languages may (partially) overlap

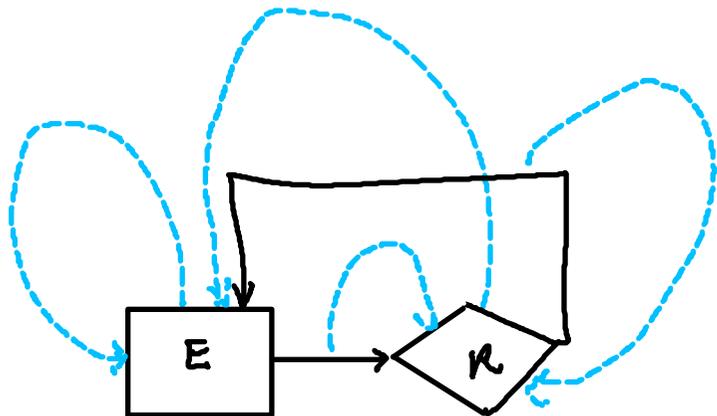
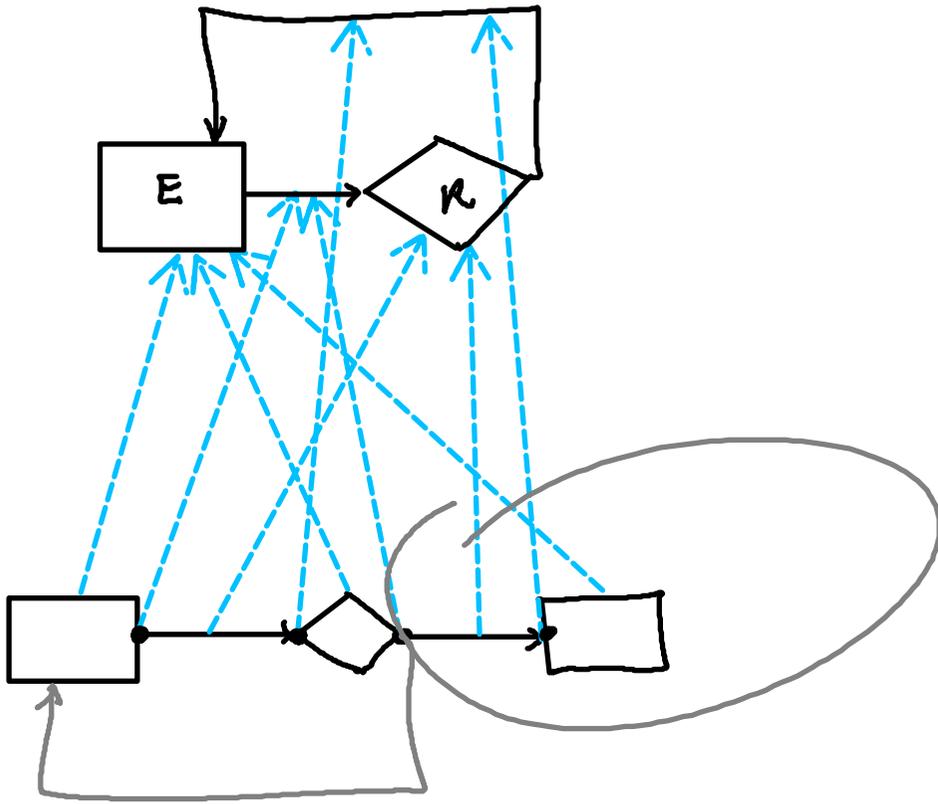




meta-circularity

meta-circular





Entity Relationship Diagram (ERD)

can be used as the MMMCL  
Meta-Model at the Meta-Circular Level

MMMCL can be used to "bootstrap"  
a meta-modelling infrastructure.  
e.g., Node and Edge in metaDepth

Bounded Exploration (of a language defined through a meta-model)

<http://alloytools.org/> Daniel Jackson @ MIT

Alloy

MAX INSTANCES  
"BOUNDED EXPLORATION"

