The Semantics of Partial Model Transformations
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Problem Statement
Models with uncertainty
- Represent choice among many possibilities
- Can be refined to many different classical models

Our Goal
Directly transform models containing uncertainty.

Existing model transformations
- Unambiguous model is assumed as input.
- Model contains uncertainty:
  • either first remove uncertainty ...
  • premature commitment
  • reduced quality
  • ... or transform all alternatives
  • hard to maintain

Explicating uncertainty with Partial Models
Syntactic
Annotations
(FASE'12)
Mandatory
Elements
Optional
Elements
May formula:
allowable configurations

Explicating uncertainty with Partial Models

Transforming Partial Models
Transfer Predicates
Represent M =⇒ N as:
ΦM ∧ R(R, M, N) = ΦN
At each application point, R is:
(ΦLHS → ΦRHS ∧ ¬ΦLHS → ΦNE)

Testing Correctness of Transformations
Correctness Criterion
Applying a transformation to a partial model should be the same as if we had created all its concretizations, applied the transformation to each separately, and encoded the result as a partial model.

Conclusion
Summary
Transforming models that contain uncertainty.
• Represent uncertainty using Partial Models.
• Lift transformation rules from classical to Partial Models.
• Check Correctness Criterion for the lifted transformation.

Next Steps
• Computationally test Correctness Criterion.
• Systematically create Transfer Predicates using FOL.
• Handle expanding/contracting model vocabularies.
• Partial Models as an Adhesive HLR Category.

References
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