Formal semantics/foundations

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Challenges

- Integrate formal analysis tools into modelling environments
- Define transformations to formal models:
  - how to reinterpret analysis results in the source
  - how to obtain fully abstract transformations
  - Problem how to proof correctness of model transformations
    - What if the source is informal?
  - classification of transformations
  - what is a correct transformation?
- Formalizing existing languages vs. new domain specific languages
- How to deal with underdefined modelling languages

...continued...

- ▶ Semantics for Domain Specific Languages:
  - ▶ Patterns
- ▶ Levels of formality vis-à-vis purpose:
  - ▶ Formalisms for semantics: categorical/denotational/operational...
  - ▶ Different approaches are useful for different kinds of properties
- ▶ Unambiguous description of semantics

- Model's life cycle and semantics
  - Different semantics at different stages
- Formalization of different levels of abstraction
  - Relate different levels
- Incremental verification
  - Scalability of verification tools

… and more…

- Define modelling languages that enable correctness by construction
- Reusability in language design
- How to help people designing good modelling languages that guarantee useful properties
- What has been done right?
- Patterns and anti-patterns for designing modelling languages

How to proceed

- Research
- Support tools
- We need well-designed modelling languages and follow a goal-oriented approach: answer what do we want out of this languages?