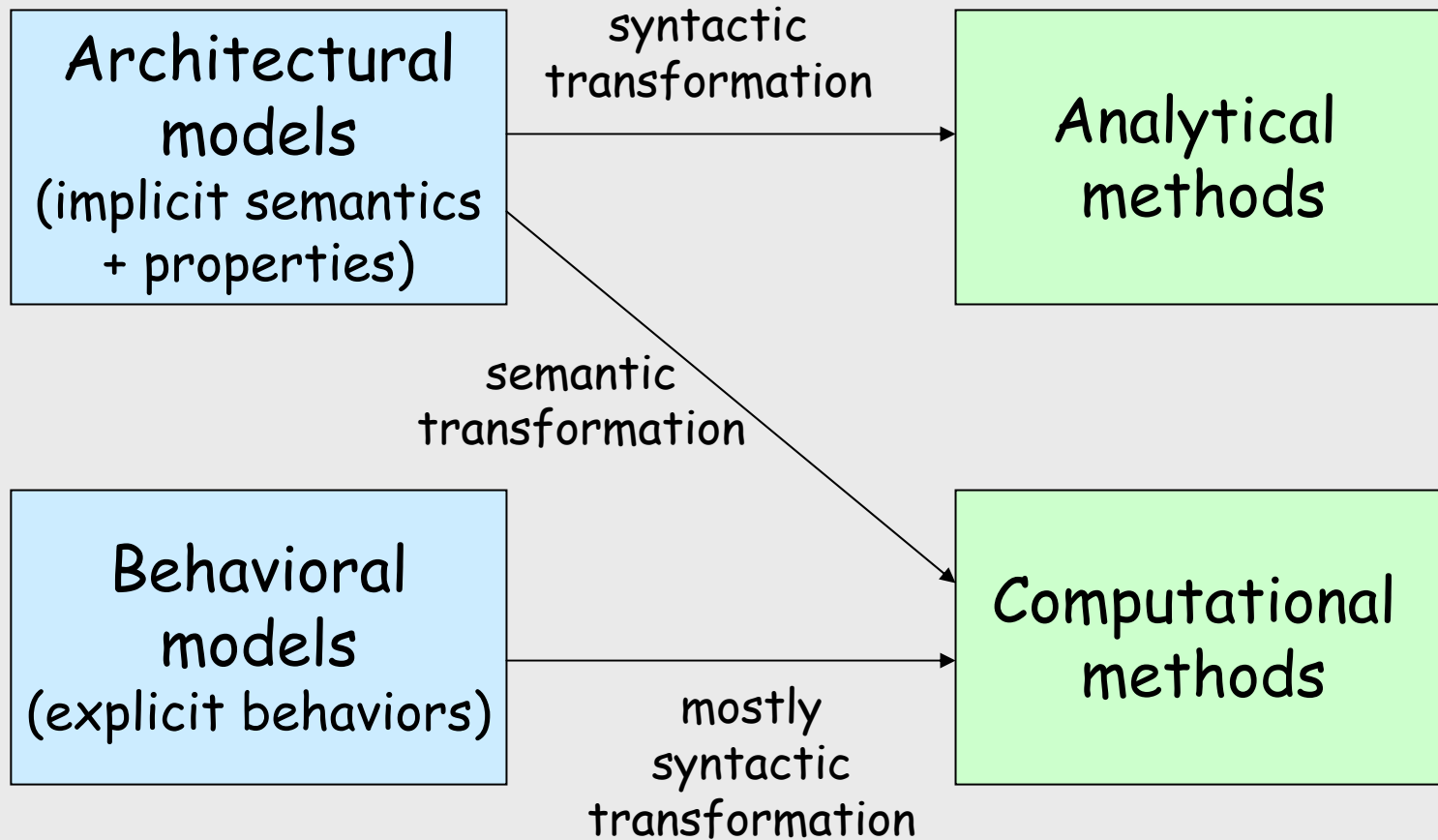# Scheduling analysis for different-level models

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Scheduling: models and analysis

Architectural vs. behavioral models

- Architectural models:
  - AADL, SysML, some UML diagrams
  - Model represents components
  - Behaviors are implicit in semantics for components and connections; modified by properties
- Behavioral models
  - Automata, UML state diagrams
  - Model represents behaviors
  - Behaviors (mostly) explicit

Scheduling analysis

- Analytical methods
  - Response-time analysis, utilization bounds, …
  - Tied to a task model, identifies worst case
  - Scalable
- Computational methods
  - Task automata, ACSR, Petri nets
  - Encode task behavior
  - State-space exploration (model checking, reachability analysis) to find timing violations
  - Expressive

Examples

- RM scheduling analysis for AADL in OSATE
  - Traverse the model, making sure that it complies with the task model (independent periodic tasks, RM scheduling protocol, etc.)
  - Extract problem instance from properties and input into an RM tool

- Scheduling analysis for AADL in Furness
  - Build task skeletons, populate with properties
  - Add state machines for task activation, data and event propagation, etc.
  - Input into a model checker