

Computer Aided Modelling Construction instead of Analysis

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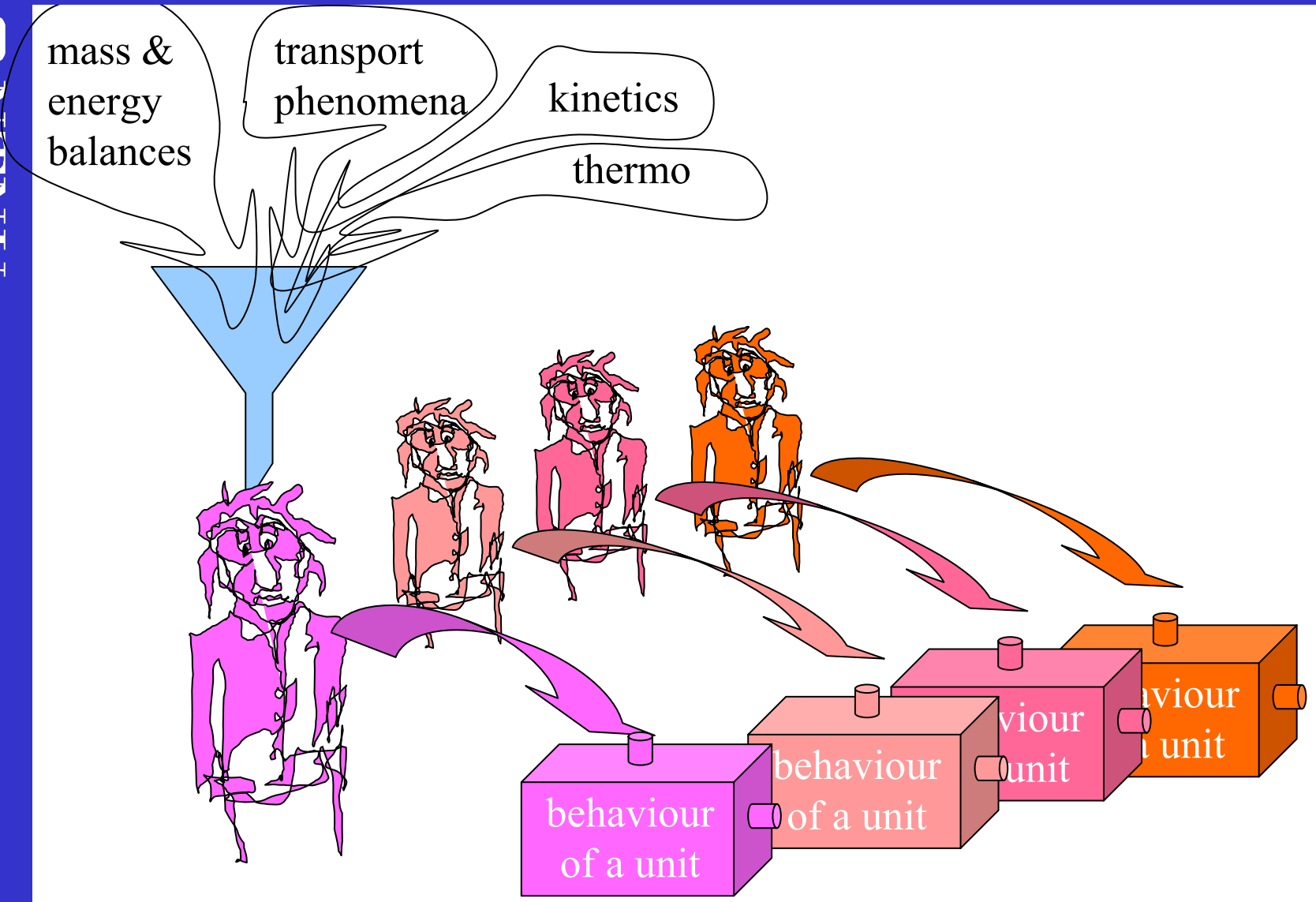
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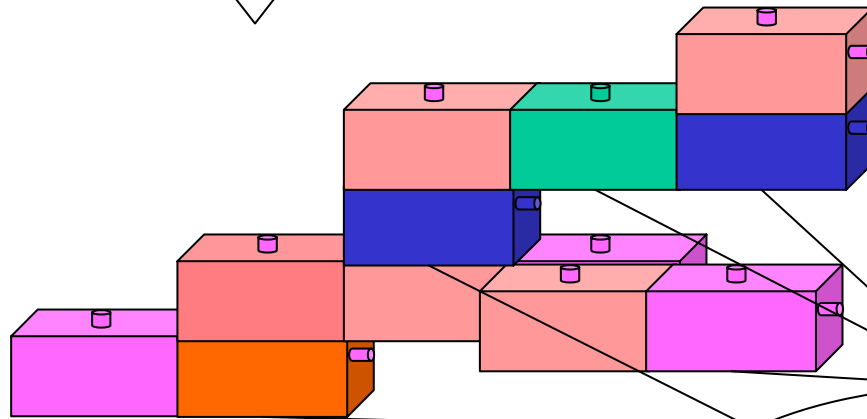
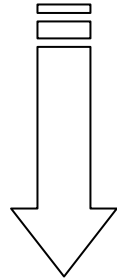
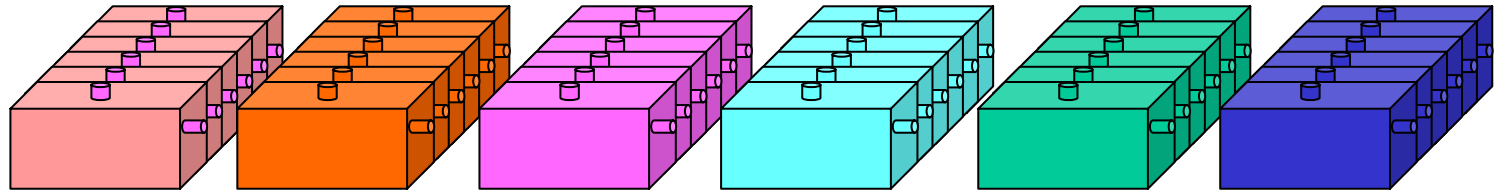
CAM:

Mapping of what represents Chemical Engineering in the form of knowledge into a programmed environment.

Traditional: create unit behaviour

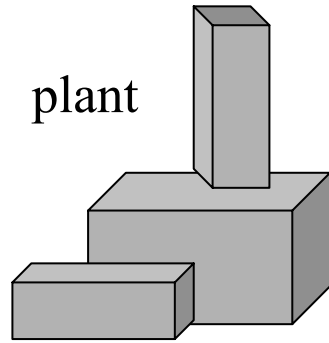


Traditional: assemble composite models



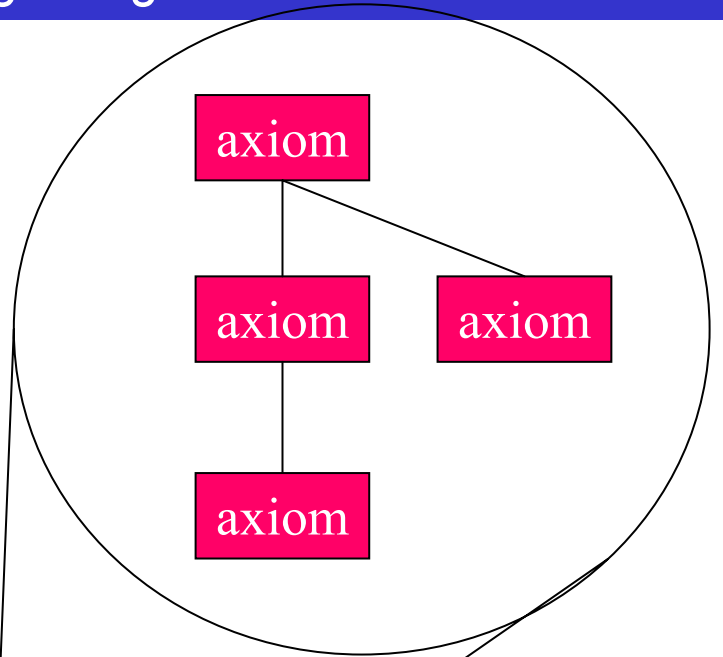
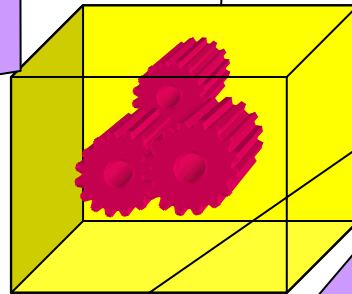
“data base”
fitted functions
providing
instances

Our approach: constructing, manufacturing using axioms



plant

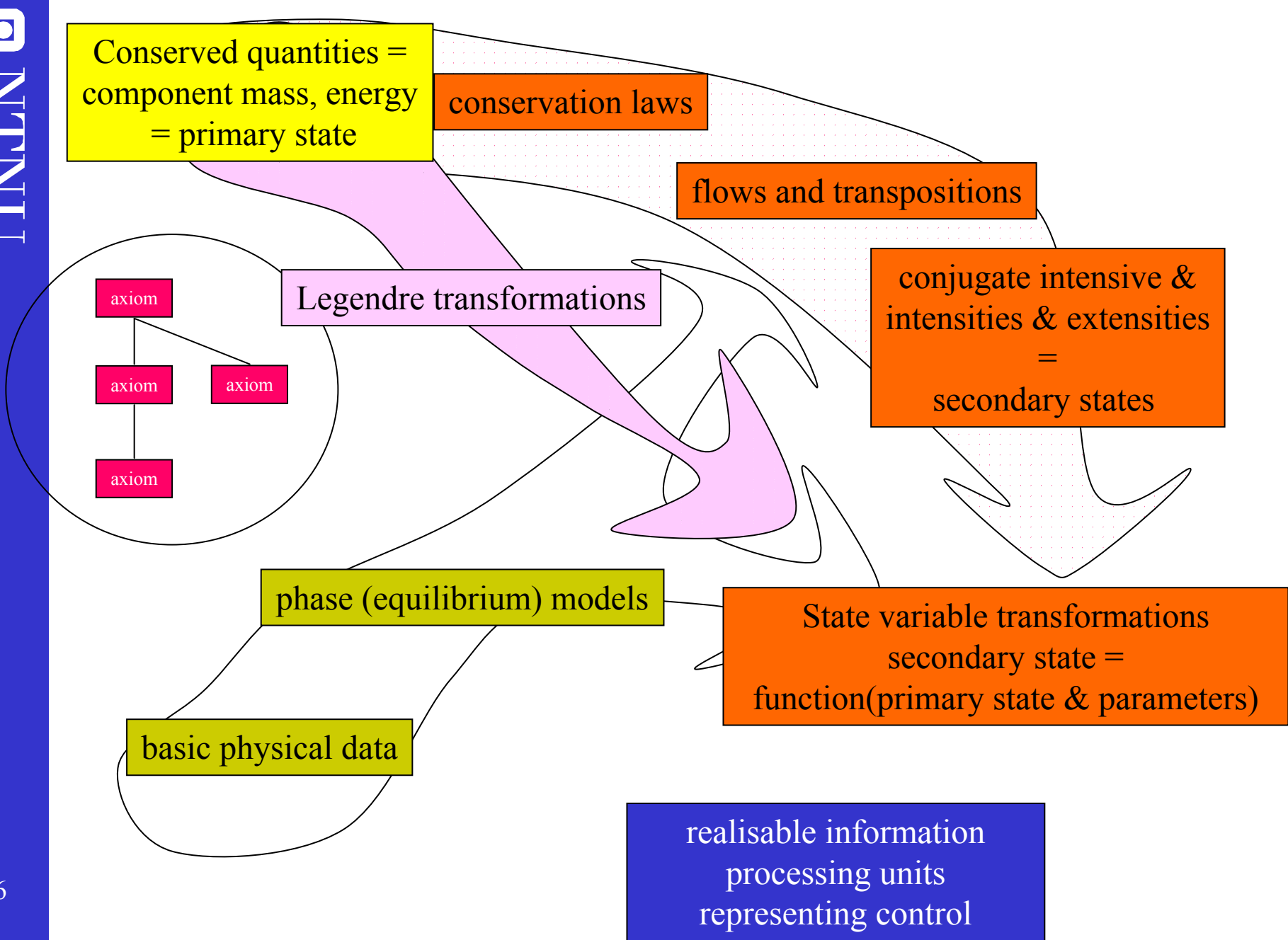
Structure =
person's view



Hierarchical model

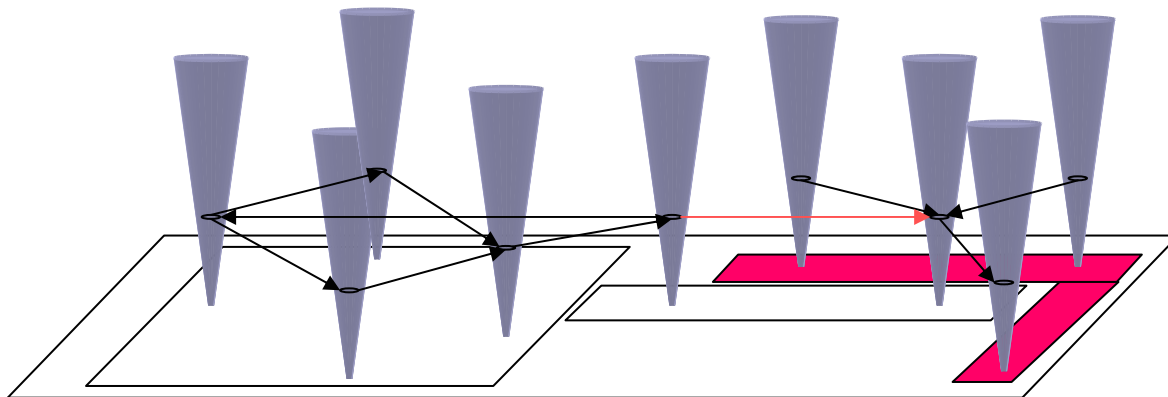


Basic knowledge organisation



Result: a hierarchical network of pyramids

- Canonical small set of essentials for the representation of the basic building components
- State-space approach
- Highly structured models build from essentially identical components
- What used to be ‘thermo or related data’ is generated on request in the structure
- Portable models on all levels
- Hierarchy to handle complexity
- Systematic handling of time-scale assumptions



- ◆ Modelling process is systematic
 - hierarchical network of control volumes
 - colouring with species augmented with reaction and permeability concepts
 - transport and transposition
 - state variable transformations
 - phase models
- ◆ Highly transparent and repetitive
- ◆ State space representation with core being linear equations
- ◆ Allows for the construction of well-defined software components
- ◆ High degree of independences
- ◆ Immediate extendable into other fields
- ◆ Highly portable, self-standing models
- ◆ Completely documented
- ◆ Modifiable
- ◆ Easy to link to any solver environment
- ◆ Integrated handling of essential time-scale assumptions
- ◆ Built-in model reduction procedure (part of assumption handling)
- ◆ Guaranteed structurally solvable models (always index 1)
- ◆ Enables switching model structures (dynamic model reduction in solver)
- ◆ User attention focused on mechanism and structures and not variables and equations
- ◆ Generation of block libraries enabled
- ◆ Extremely efficient (time reduction of 1-2 order of magnitudes depending on the starting point)