



# Qualitative Model Induction

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# Introduction

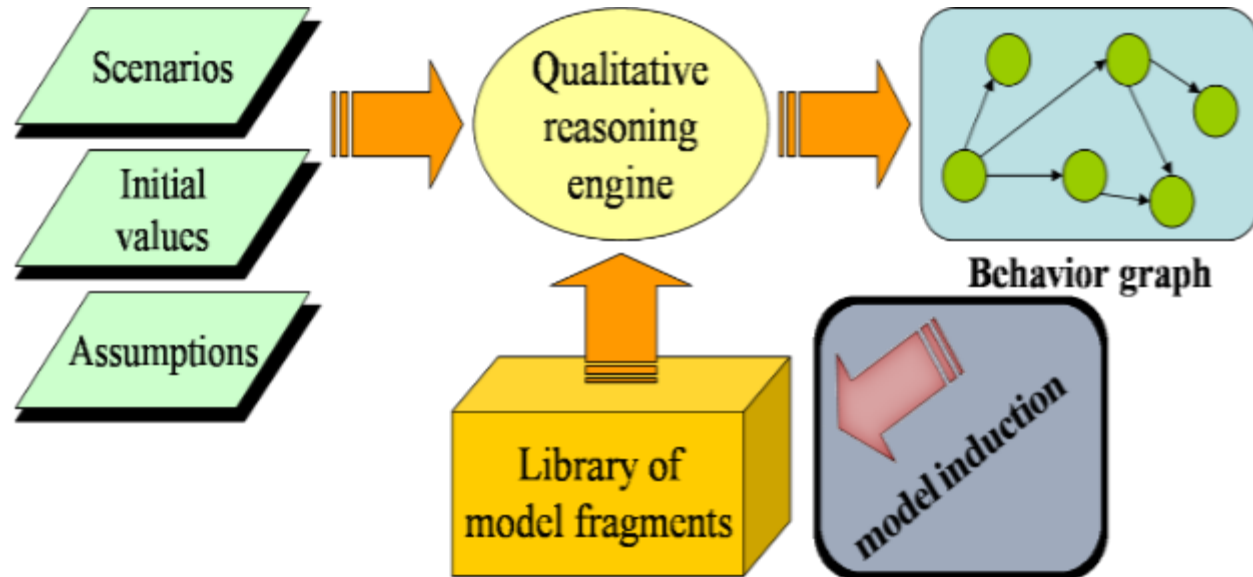
## Input

- Full envisionment of behavior
- Entity Hierarchy
- No noise

## Output

- model fragment(s)

but: current code does not produce a working model yet



# This project

## Goals:

- Compositional model fragments:
  - N communicating vessels
  - Stacked bathtub model
  - Interacting populations
- Lift "full envisionment" requirement
- Substance behavior
- Increase efficiency (model induction should be better than expert)



# Background

## Causal Path

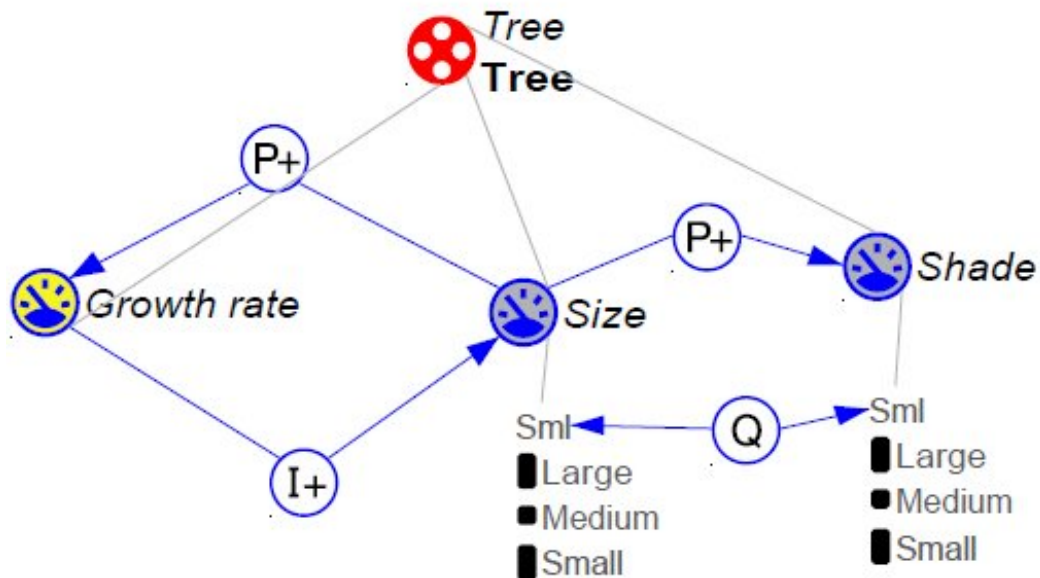
*starts with an influence, followed by any number of proportionalities*

$$Q_1 \xrightarrow{I+} Q_2 \xrightarrow{P+} \dots \xrightarrow{P-} Q_{n-1} \xrightarrow{P+} Q_n$$

# Background

## Cluster

*a set of quantities are in the same cluster if their values and derivatives correspond or inversely correspond, and if they belong to the same entity.*



# Background

## **Super Cluster**

*a set of clusters in the same super cluster if their values and derivatives correspond or inversely correspond.*

# Background

## **Actuations**

*influences that connect part of the clusters and explain the source of change in the system.*

Every super cluster should take part in at least one actuation, otherwise the whole is not a system but multiple separate systems.

# This project

Develop some standard for a 'useful fragment'

- Static vs. Process
- Everything belonging to one entity
- Things like 'birth', 'death', 'immigration'
- One influences per fragment
- Fragments according to re-use

Approach:

- split up current output into fragments as extra step
- modify algorithm to work with fragments from the start

No focus on current output but on 'ideal' input