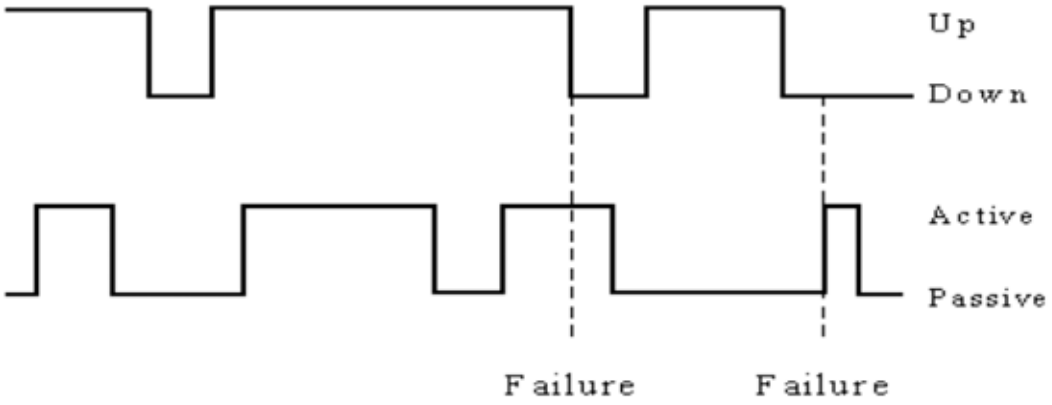
Section 1: modelling based evaluation

- John Meyer: “Model based evaluation of user-perceived system quality”
- Ivan Mura: “From computer science to system biology and viceversa: new modelling challenges, approaches and tools”

User-perceived quality

- Evolution of measure types (from perf. ev. to user-perceived measures)
  - In the beginning …
  - Xability measures: Dependability, performability, survivability
  - Quality of *X* measures: QoS, QoE, QoP
- Accounting for the use environment
  - Need a use(r) profile
  - User-observed failures, normalized MTTF (depends on active periods of users) - reliability, availability conditioned on the use profile



- User satisfaction
  - Objective measures: Performability, OoS – often just a re-interpretation in QoS terms of a dependablity measure.
  - Objective measures do not always capture the correct behaviour: need to put the user in the loop
  - Subjective measures – subjective quality assesment: QoE, QoP
- Model-based evaluation of QoE/QoP – requires high level experiments that involve the users (similarities with video compression algorithm assessment)

- **DISCUSSION**
  - relationship to market models, and related psycological models
  - subjectivity of satisfying the average

Modelling in biology

- Modelling in biology
  - System biology "…*understand complex biological systems through the integration of experimental and computational research*
  - Very large community
  - Validated models are used for predictive purposes (diminish the cost of wet-lab experiments)
  - Invalidated models allow to postulate new hypothesis to set up new experiments
- Solutions devised – model based
  - From physics (continous) and from computer science (discrete)
  - Many tools available on both sides
  - Measures: "typical quantitative" (e.g. concentrations), resiliency to perturbations, which kinetics rate determines a certain phenomenum, etc
- Peculiarities.
  - Models of very large size (10^{24} for a cell toy example)
  - Models have "sites of interactions" which are difficult to specify
  - Biological systems can exhibit oscillatory behaviour also in steady state conditions (measure?)
  - Partial knowledge of the system

Modelling in biology

- Relationships with computer science
  - Continous approximations – set of ODE
  - Sophisticated interactions (split of interactions and their rate)
  - Abstraction as a way to manage unknowns
  - Speed-up of stochastic simulation (significant improvements of Gillespie's algorithm)

- **DISCUSSION**
  - Links between biology and dependability - mainly on common tools that can be used

Modelling in biology

- **FINAL DISCUSSION**
  - Validation issues
    - Look for relationships between variables more than on absolute values
    - Check against wet-lab experiments
    - Validate the model or the results? For dependablity is more the results, for biology is more the model itself, so as to get useful insights
    - Validated models can be re-used?
  - Measures issues: measures defined are informative in understanding where the problem comes from?