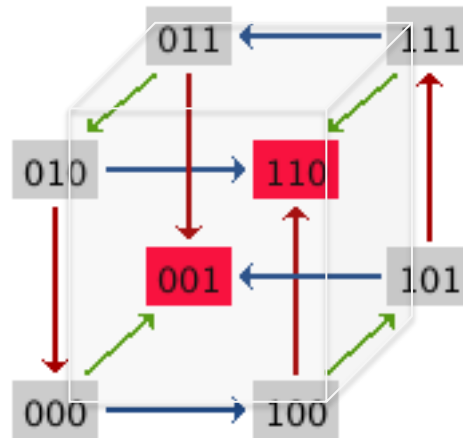
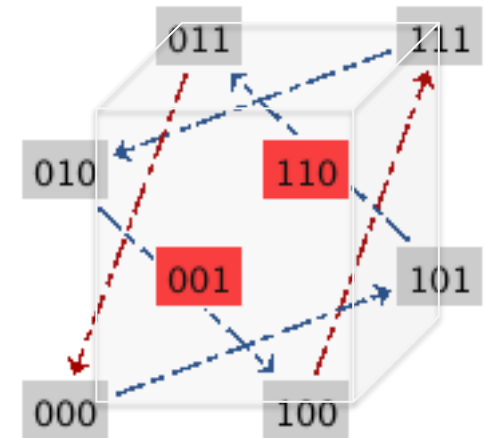


QUALITATIVE MODELS, WHAT ABOUT SIMULATION PARAMETERS?

Dynamics over the whole state space

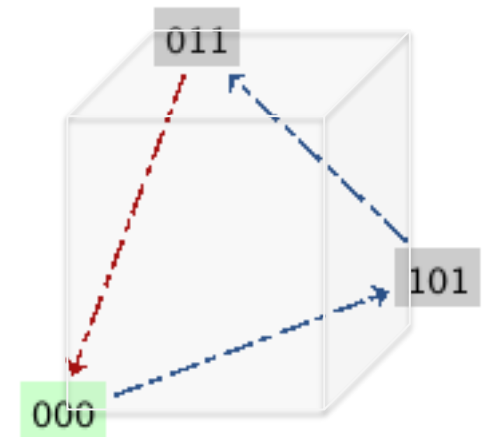
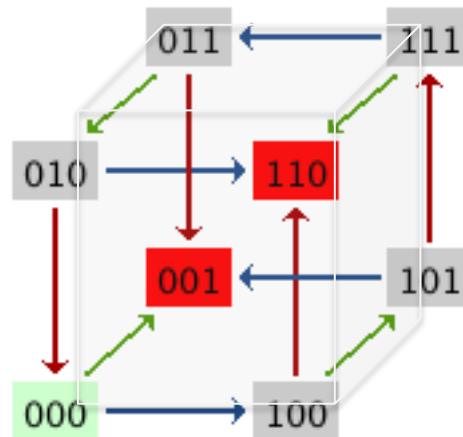


ASYNCHRONOUS



SYNCHRONOUS

From a given initial condition



C. Chaouiya
Paris, September 2013

Simulation parameters in GINsim

The screenshot shows the 'Construction of the Dynamics' dialog box in GINsim. The dialog is divided into several sections: 'Strip outputs' (checked), 'Simulation Settings' (with a filter and a list of parameters), 'Construction Strategy' (with 'State Transition Graph' selected and 'Depth First' chosen), 'Size limits' (with 'Depth' and 'Number of States' fields), 'Priority Class Selection' (with 'asynchronous' selected), and 'Initial States' (with a table of initial states). Callouts point to specific features: 'Perturbations' points to the 'Select a perturbation' dropdown; 'Updating scheme' points to the 'asynchronous' selection; 'Representation of the dynamics' points to the 'State Transition Graph' selection; 'Initial conditions' points to the 'initState_1' and 'initState_2' rows in the 'Initial States' table; 'Strategy + limitation of the exploration' points to the 'Depth First' selection; and 'Reduction of (pseudo)-outputs' points to the 'Strip outputs' checkbox.

Perturbations

Updating scheme

Representation of the dynamics

Initial conditions
0 (all) or 1,...

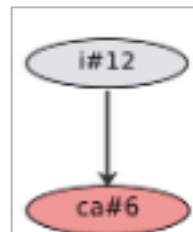
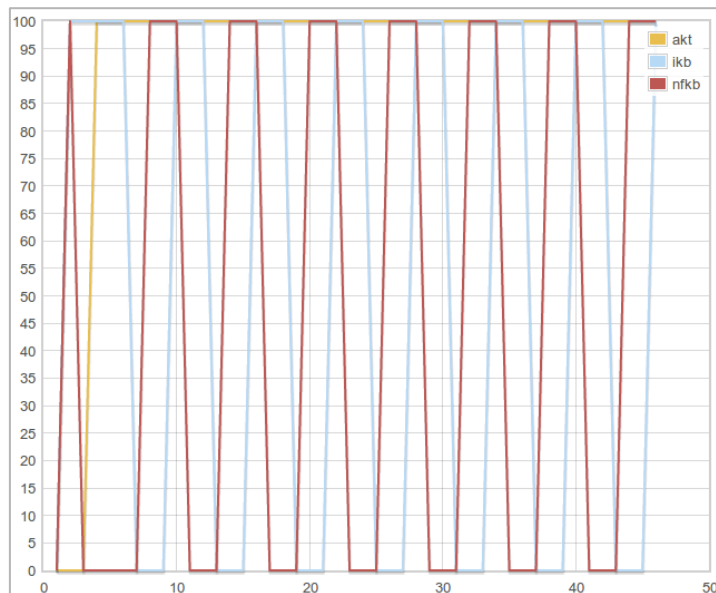
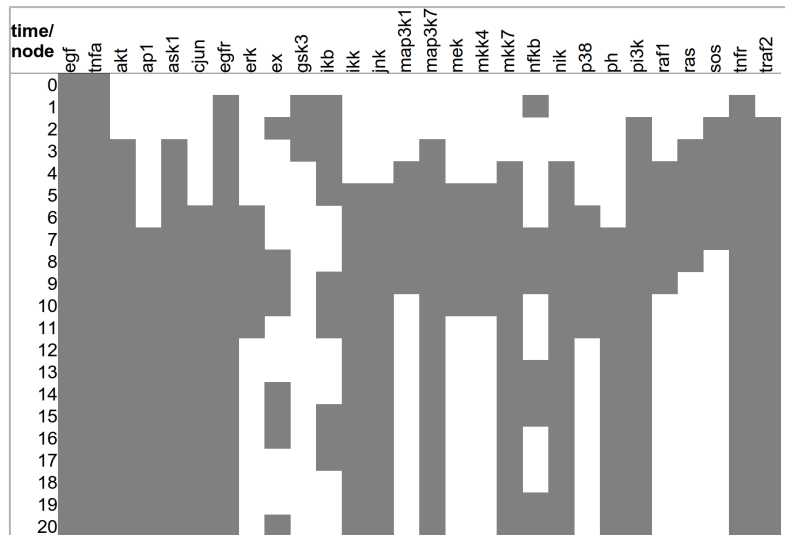
Strategy + limitation of the exploration
Reduction of (pseudo)-outputs

name	use	G0	G1	G2
initState_1	<input checked="" type="checkbox"/>	M1	0	0
initState_2	<input type="checkbox"/>	0	0	0

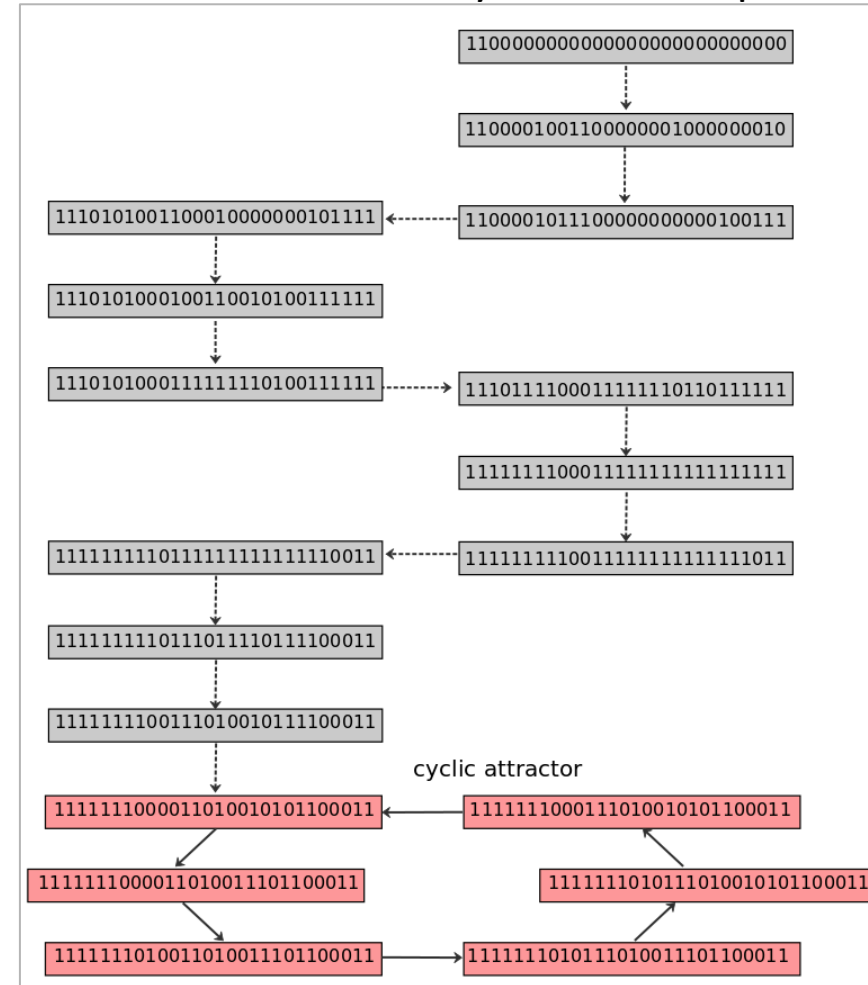
State Transition Graph	Strongly Connected Components Graph	Hierarchical Transition Graph
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

asynchronous	synchronous	priorities_1
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Representations of the dynamics



A Boolean model, synchronous update

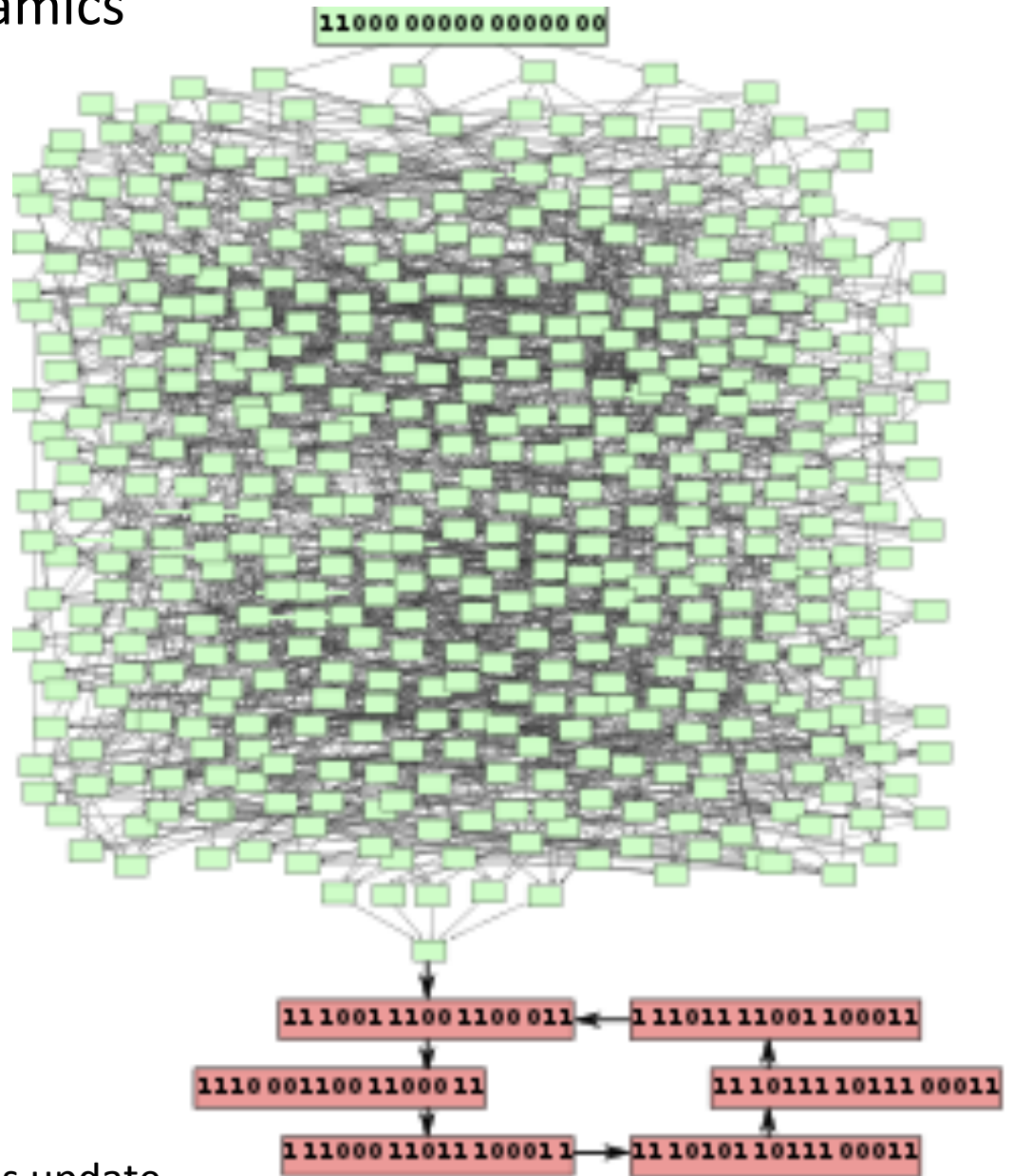


<http://arxiv.org/abs/1309.1910>

SBML Qualitative Models: a model representation format and infrastructure to foster interactions between qualitative modelling formalisms and tools

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Representations of the dynamics



The same Boolean model, asynchronous update

A variety of updating schemes

Block-sequential

Stochastic simulations BoolNet, MaBoss

A variety of strategies to limit the construction of the dynamics

Exploration strategy (breadth/depth first)

Number of states / depth limitation

Specification of the behaviour of input nodes

Cell Collective vs GINSim

Perturbations: modification of the logical functions

Representation of the dynamics