Model of the mammalian cell cycle with 3 different tools

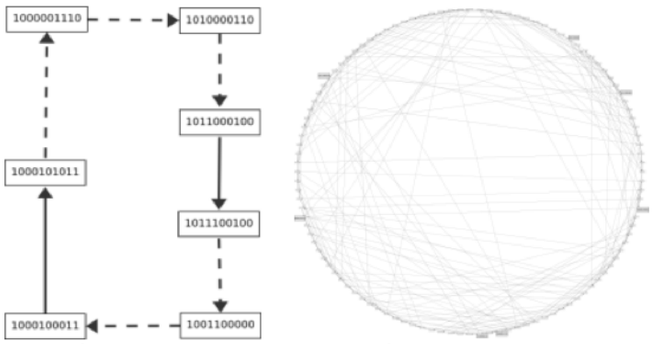
Original publication:
A.Fauré, A.Naldi, C.Chaouiya, D.Thieffy . Dynamical analysis of a generic Boolean model for the control of the mammalian cell cycle. Bioinformatics (2006); 22(14): 124-131

(1) GINsim results

Two asymptotic behaviors:

- With CycD = 0: one stable steady state (G1 arrest : Rb=1, p27=1, Cdh1=1)
- With CycD = 1: unique multi-cycle attractor

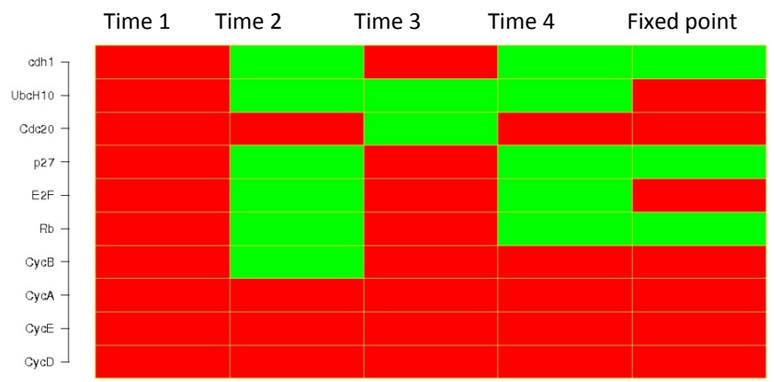
For CycD = 1, the state transition graphs according to two different updating strategies: synchronous and asynchronous are shown:



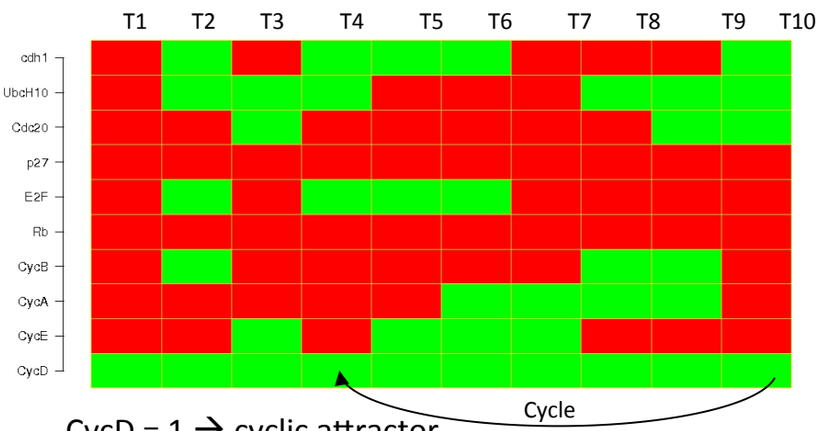
Synchronous strategy Asynchronous strategy

(2) BoolNet results

Two asymptotic behaviors are observed according to the initial state of CycD
(Note that BoolNet provides computations with synchronous update strategy)



CycD = 0→ fixed point (G1 arrest : Rb p27 Cdh1)

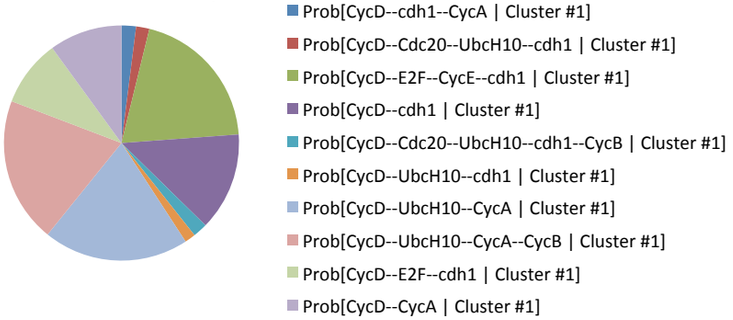


CycD = 1 → cyclic attractor

(3) MaBoSS results

Two indecomposable stationary distributions (clusters):

- One fixed point: Rb = 1, CDH1 = 1, p27 =1 (not shown)
- One multi-cyclic attractor



Time dependent activity of cyclins (initial condition: CycD=1)