

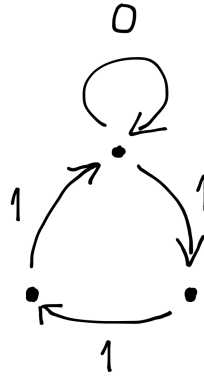
Homework 3

TIF150, Information theory for complex systems 2017

CA information

Consider a one-dimensional cellular automaton given by elementary rule R174, i.e., neighbourhoods 110, 100, and 000 map to 0, and all others to 1.

Let the initial state be characterized by the following finite state automaton (where it is assumed that if two arcs leave the same node they have equal probabilities).



- Is this rule reversible, almost reversible, or irreversible?
- What is the initial entropy density s (at $t = 0$)?
- Derive the finite state automaton of the CA state after one time step ($t = 1$).
- What is the entropy density s at this time ($t = 1$)?
- What is the entropy density s after two time steps ($t = 2$)?