

An example for exercises on creating ASTGs from models

Exercise 1. Figure 1 shows a model M with an interaction graph I and a logical parameter function K . With the maximal activity levels $\max(v_1, v_2) = [2, 2]$.

Please create the ASTG of this model, and find out all the attractors. Note that, one needs to list the process of how the ASTG is achieved through the resources of each component under each state.

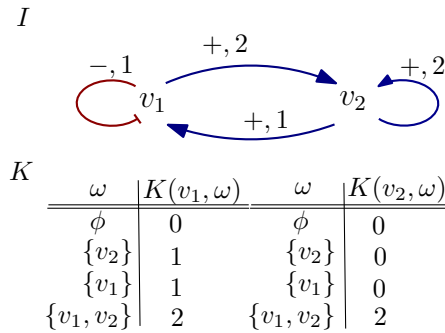


Figure 1: A model $M = (I, K)$. $\max(v_1, v_2) = [2, 2]$.

Answer 1. The resources of each component under each state are listed in the table below.

state: x		Resource of v_1	Resource of v_2	target value of v_1	target value of v_2	transitions of x	
x_{v_1}	x_{v_2}	$\text{Res}_{v_1}(x)$	$\text{Res}_{v_2}(x)$	$K(v_1, \text{Res}_{v_1}(x))$	$K(v_2, \text{Res}_{v_2}(x))$	$x_{v_1}^{\text{next}}$	$x_{v_2}^{\text{next}}$
0	0	$\{v_1\}$	\emptyset	1	0	+1	0
0	1	$\{v_1, v_2\}$	\emptyset	2	0	+1	-1
0	2	$\{v_1, v_2\}$	$\{v_2\}$	2	0	+1	-1
1	0	\emptyset	\emptyset	0	0	-1	0
1	1	$\{v_2\}$	\emptyset	1	0	0	-1
1	2	$\{v_2\}$	$\{v_2\}$	1	0	0	-1
2	0	\emptyset	$\{v_1\}$	0	0	-1	0
2	1	$\{v_2\}$	$\{v_1\}$	1	0	-1	-1
2	2	$\{v_2\}$	$\{v_1, v_2\}$	1	2	-1	0

Table 1: Here, $x_{v_1}^{\text{next}} = \text{sign}(K(v_1, \text{Res}_{v_1}(x)) - x_{v_1})$, $x_{v_2}^{\text{next}} = \text{sign}(K(v_2, \text{Res}_{v_2}(x)) - x_{v_2})$.

Figure 2 shows the ASTG T . T has only one cyclic attractor, $\{00, 10\}$ (there are no outgoing transitions).

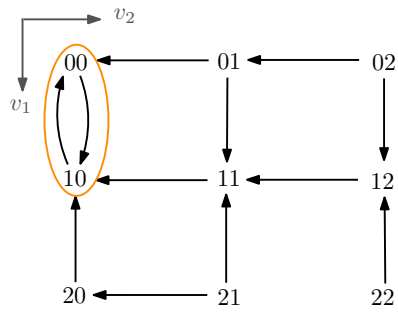


Figure 2: The ASTG of M from Exercise 1 and the attractor of it.