# Assignment 3

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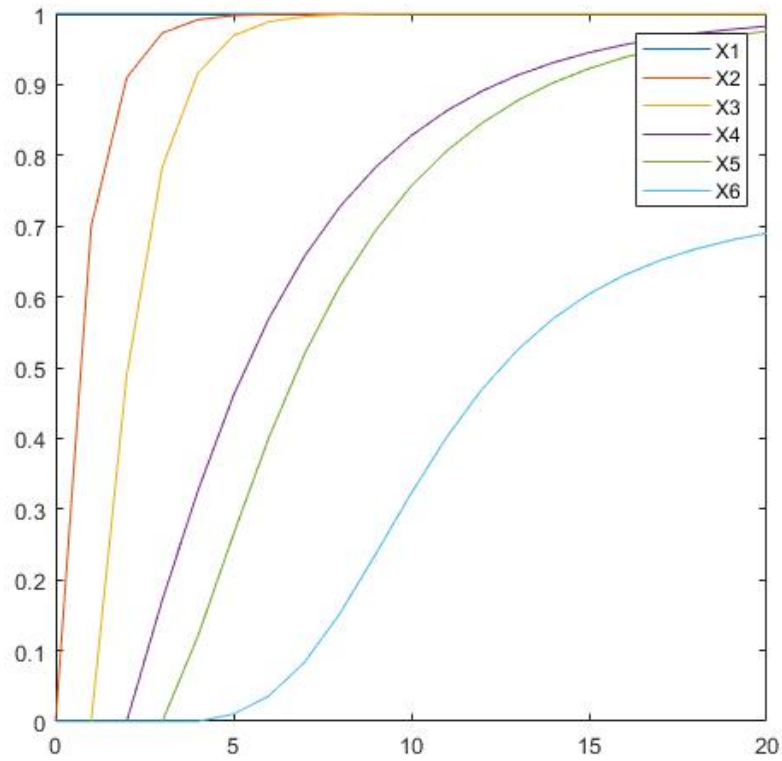
Q.1



Figure 1: Temporal causal network model on the impact of world stimulus on action

mb=[

```
1 NaN
1 NaN
2 NaN
3 5
4 NaN
5 NaN ]

mcwv=[
1 NaN
1 NaN
1 NaN
1 1
1 NaN
1 NaN]

msv=[
1
0.7
0.7
0.7
0.7
0.7]

mcfwv=[
1 NaN NaN
1 NaN NaN
1 NaN NaN
NaN 1 NaN
1 NaN NaN
NaN NaN 1]

mcfpv = cat(3,[
NaN NaN
NaN NaN
NaN NaN
NaN NaN
NaN NaN
NaN NaN
],[
NaN NaN
NaN NaN
NaN NaN
2 NaN
NaN NaN
NaN NaN
],[
```

NaN NaN
NaN NaN
NaN NaN
NaN NaN
NaN NaN
5 0.8])

iv = [1; 0; 0; 0; 0; 0]
endtimeofsimulation=20;
dt=1;


Q2
The action occurs at second 12 after the world stimulus.

Q3.
The speed factor describes the speed of change of the opinion state for each individual in the network. Thus, the speed factor (ms) of any state before esa should change.

Q4.
When $ms(esa) = 0.1$, the value of esa becomes higher than 0.5 at 21 second.

Q5.
The step size should change to have more smooth curves to be able to analyse the patterns more precisely. Specifically, the step size should be smaller.

Q6

The graph curves become smoother because the computer steps we take to represent real world step seconds are more per second.

This step size refers to the fixed steps of step size second in which the simulation time advances until it reaches the real time. On the other hand, the speed factor describes the speed of change of the opinion state for each individual in the network. This provides a timing of the processes for a state.

Therefore, an increase in ms will slower the dynamics of the model and the results, whereas an increase in dt will only decrease the accuracy of our graph (if it is not too large, as an increase above the maximum can cause the model to crash as the steps are too big). On the other hand, a decrease in ms will fasten the dynamics of the model and the results, whereas a decrease in dt will increase the accuracy of our graph (as long as it is not too small, as the computer might be unable to process it). In general, dt should be below 1. Ms depends on the network we are trying to represent.

Q7
We would use step size of less than 0.5, preferably $0.001 < dt < 0.01$ because it is very important to take small step sizes to not loose detail of the very small changes for esa(t).
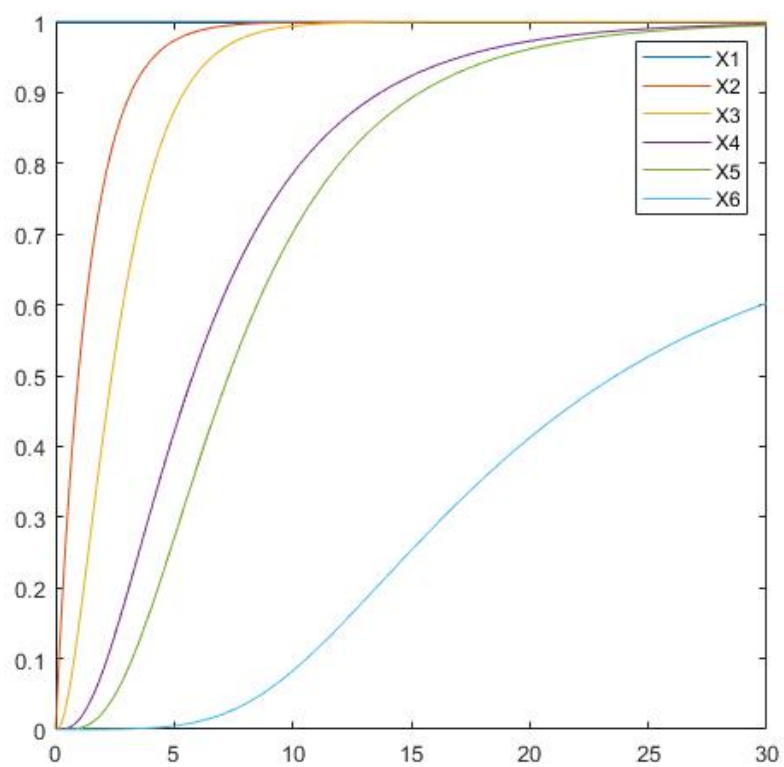
The speed factor we would use is $ms(esa) = 0,57$.

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Figure 2: Temporal causal network model with $dt = 0.1$