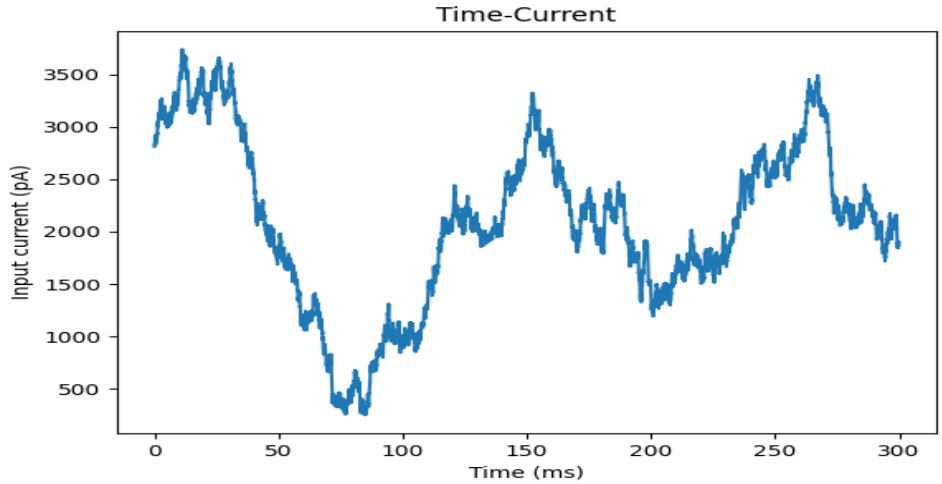
Seyed Hossein Mohammadi (96222096)

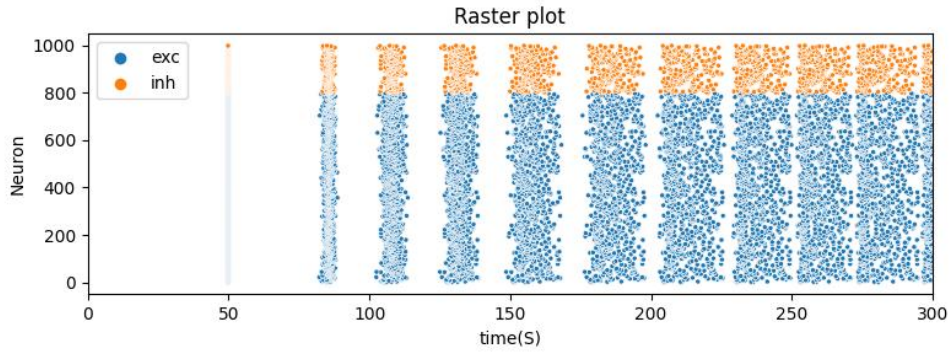
Project 2 – Population Modeling

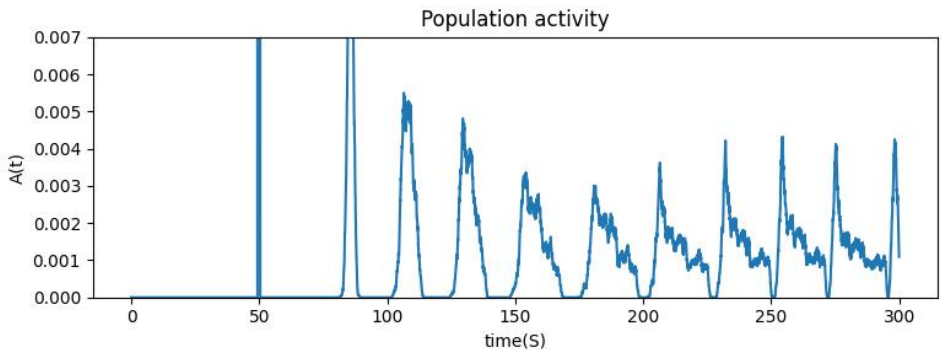
1- Fully connected 800 excitatory and 200 inhibitory AELIF with the following config with J=6.5:

'dt=0.03125, R=10, tau=8, theta=-40, U_rest=-75, U_reset=-65, U_spike=5, ref_period=2, ref_time=0, theta_rh=-45, delta_t=2, a=0.01, b=500, tau_k=100'

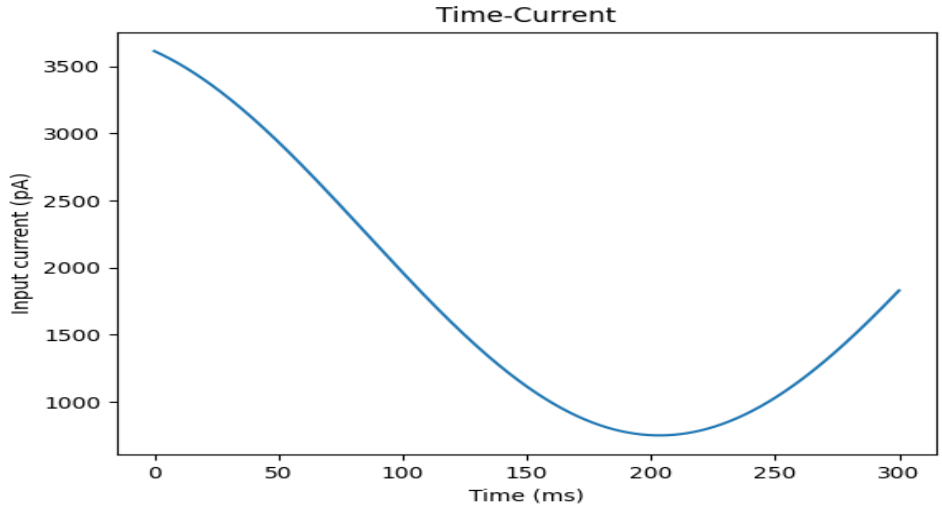
Test 1:

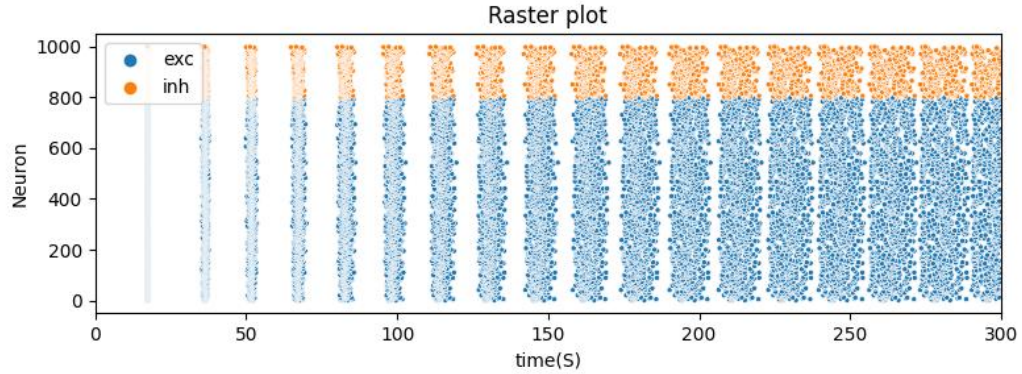


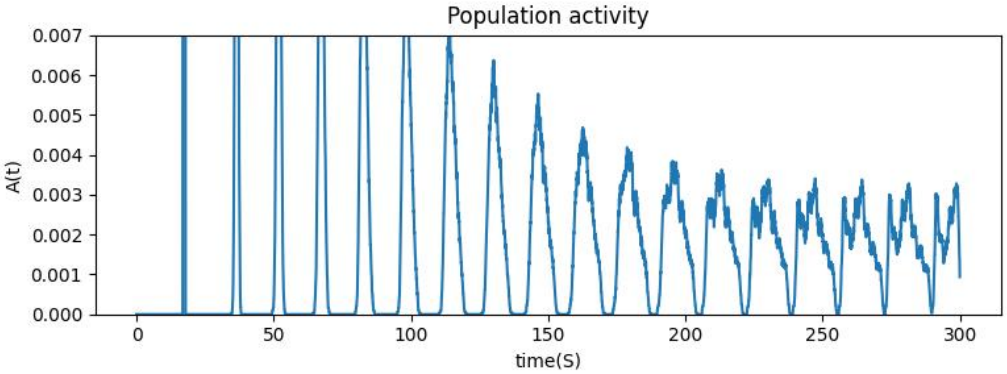




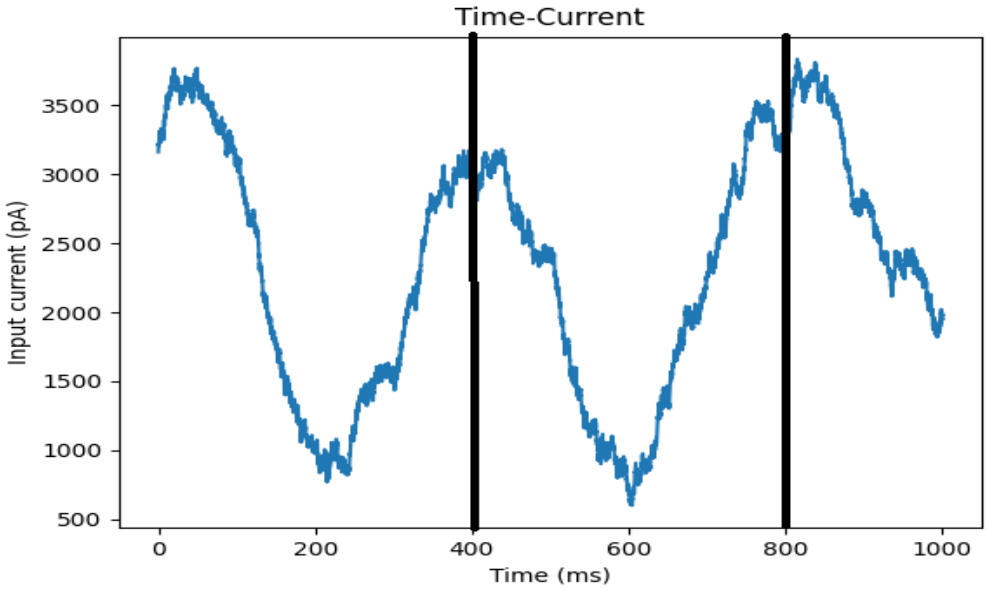
Test 2:

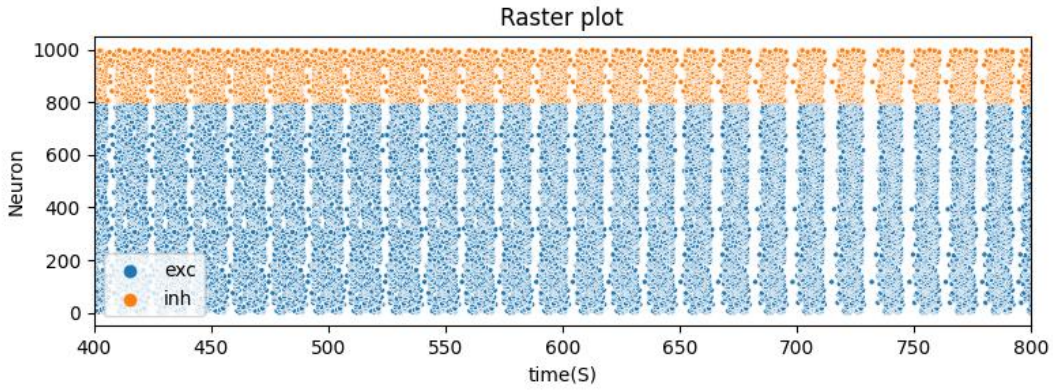

Time-Current
Input current (pA)
Time (ms)

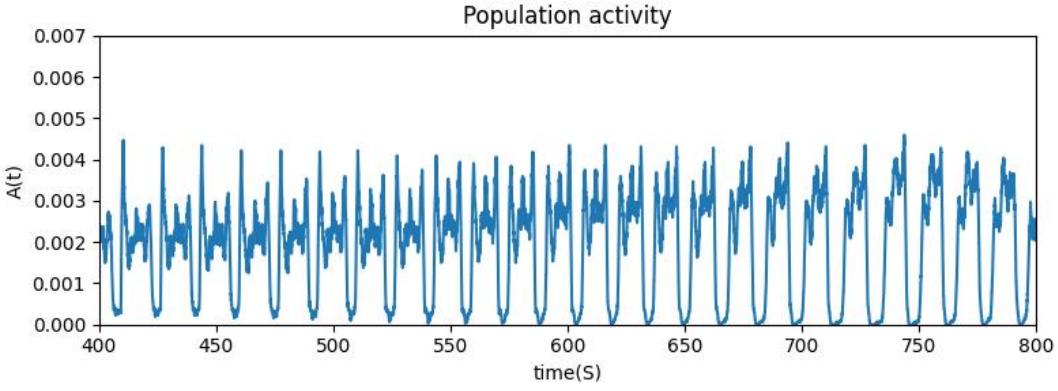

Raster plot
exc
inh
Neuron
time(S)


Population activity
A(t)
time(S)

Test 3: similar to test 1 but 3 times the time.







2-

POP1: fully connected 800 excitatory and 200 inhibitory AELIF with the following config with J=6.5

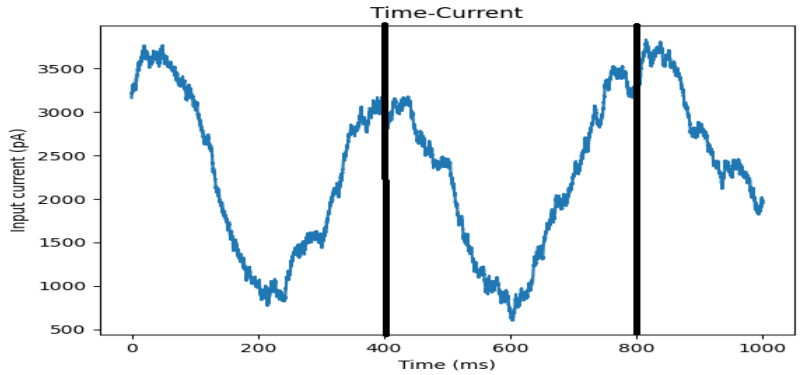
```
'dt=0.03125, R=10, tau=8, theta=-40, U_rest=-75, U_reset=-65, U_spike=5,
ref_period=2, ref_time=0, theta_rh=-45, delta_t=2, a=0.01, b=500, tau_k=100'
```

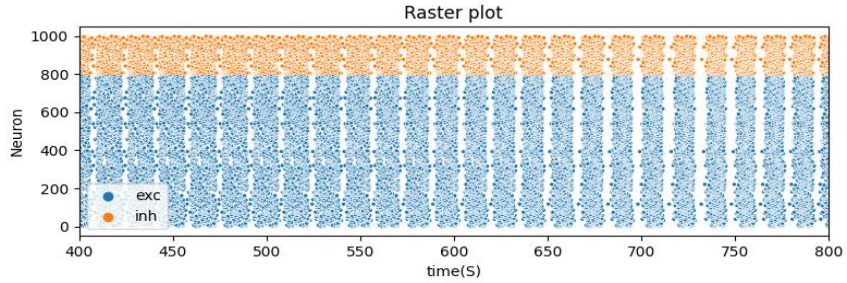
POP2: fully connected 300 excitatory and 100 inhibitory LIF with the following config with J=5.5:

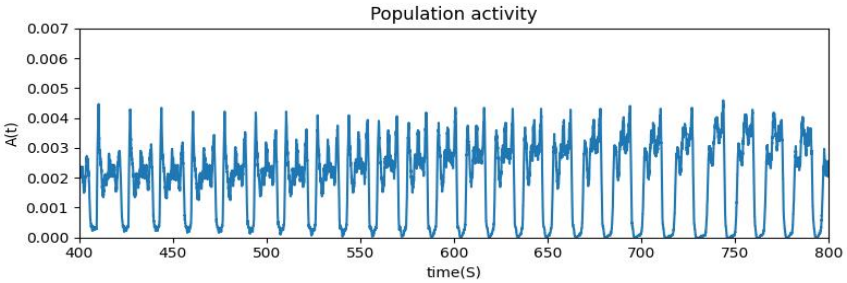
```
'dt=0.03125, R=10, tau=8, theta=-47, U_rest=-79, U_reset=-65, U_spike=5'
```

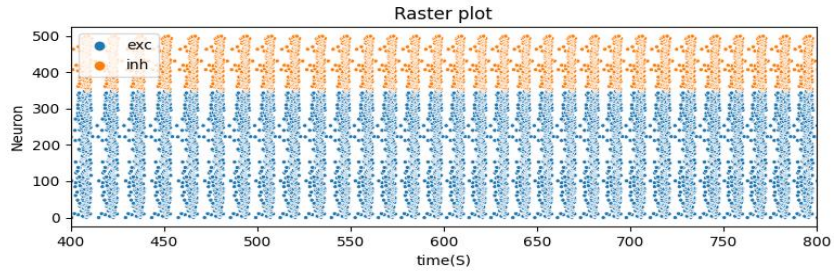
Pop1 is fully connected and directed to pop2 with J=10.

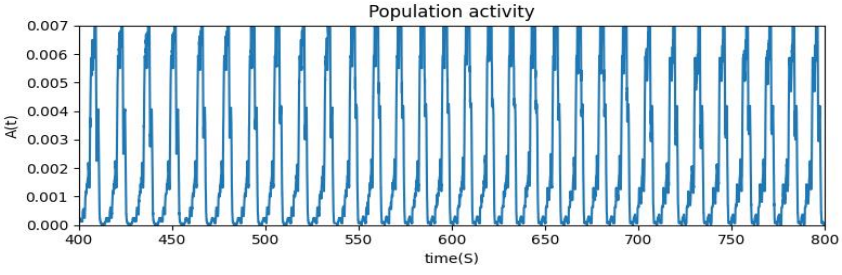
Test 1:


Time-Current
Input current (pA)
Time (ms)

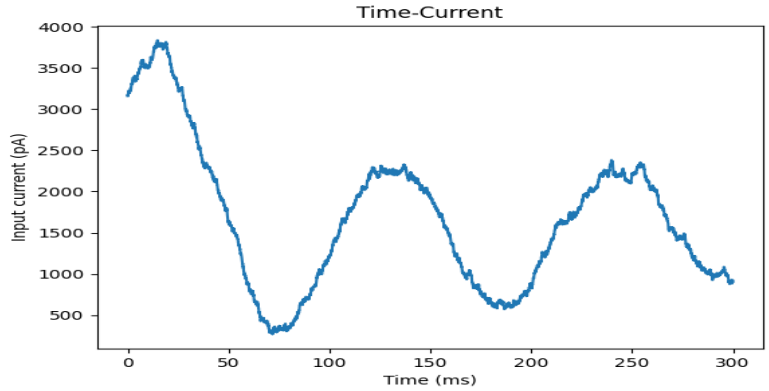

Raster plot
Neuron
exc
inh
time(S)

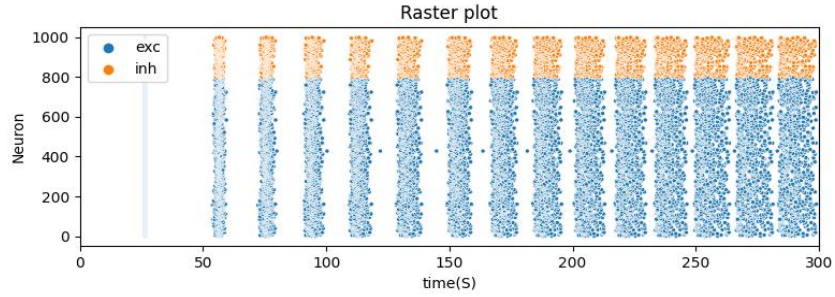

Population activity
A(t)
time(S)

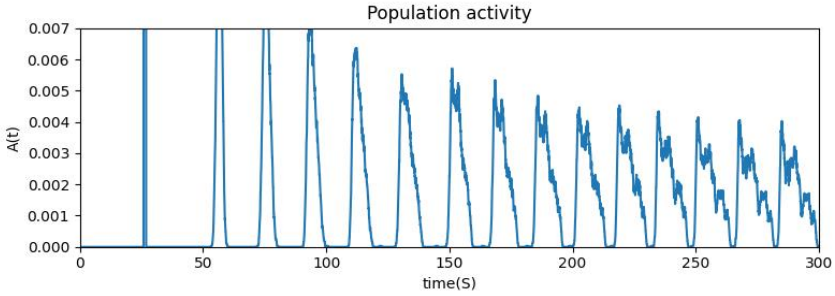

Raster plot
Neuron
exc
inh
time(S)

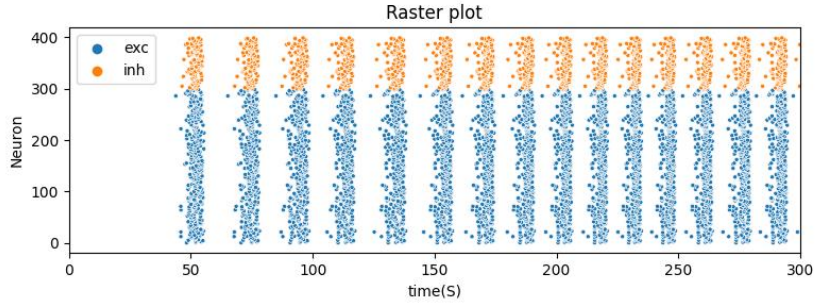

Population activity
A(t)
time(S)

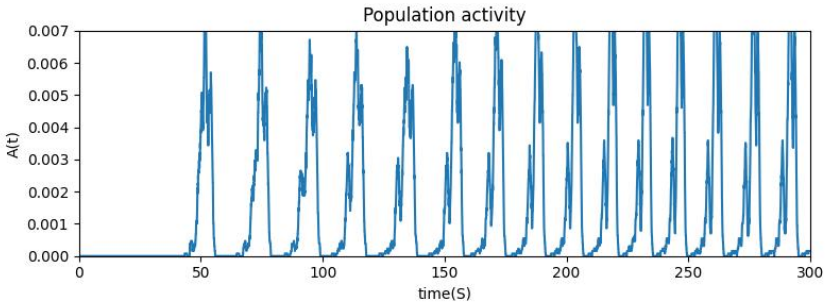
Test 2:


Time-Current
Input current (pA)
Time (ms)

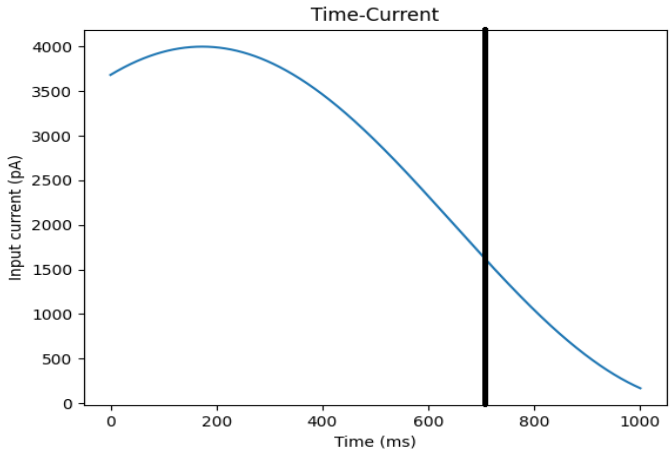

Raster plot
exc
inh
Neuron
time(S)

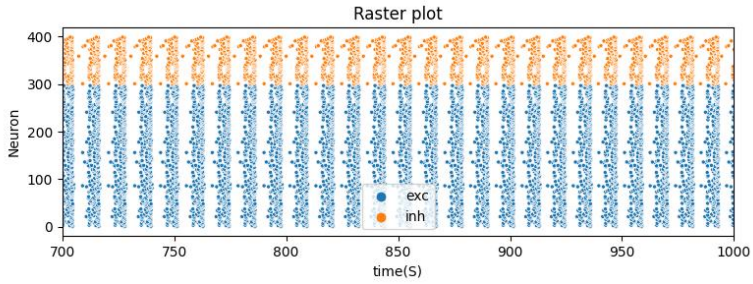

Population activity
A(t)
time(S)

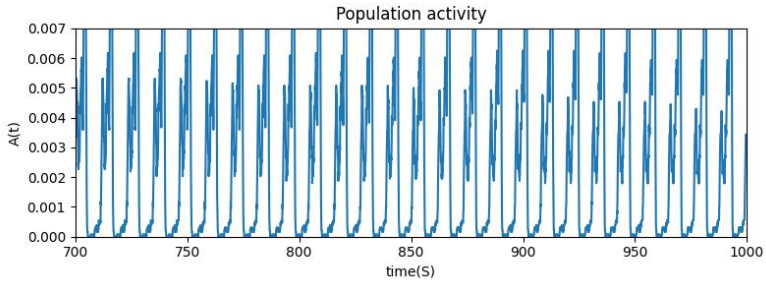

Raster plot
exc
inh
Neuron
time(S)

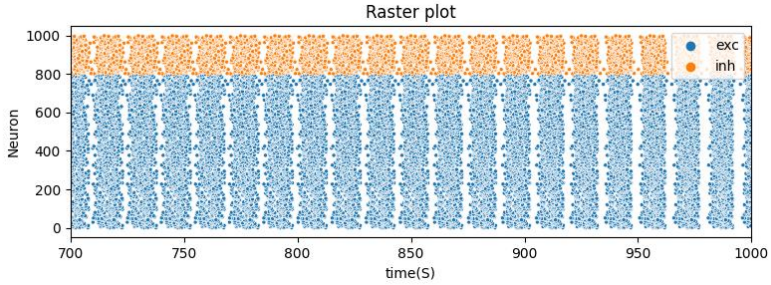

Population activity
A(t)
time(S)

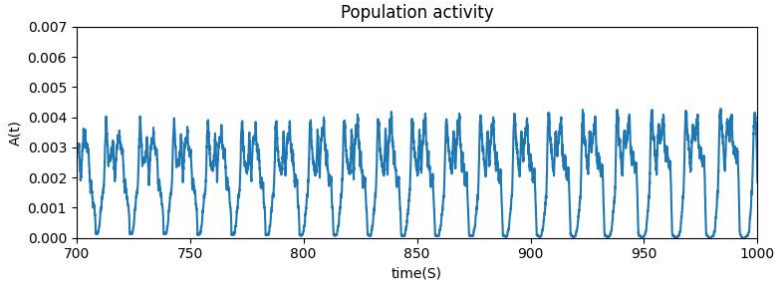
Test 3:


Time-Current
Input current (pA)
Time (ms)


Raster plot
Neuron
time(S)
exc
inh


Population activity
A(t)
time(S)


Raster plot
Neuron
time(S)
exc
inh


Population activity
A(t)
time(S)

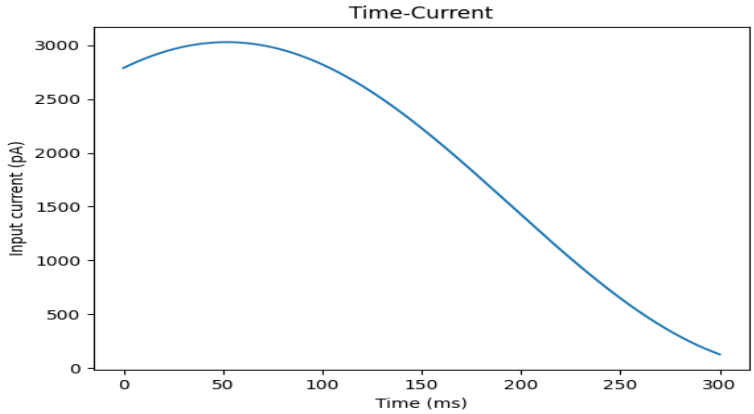
Extra –

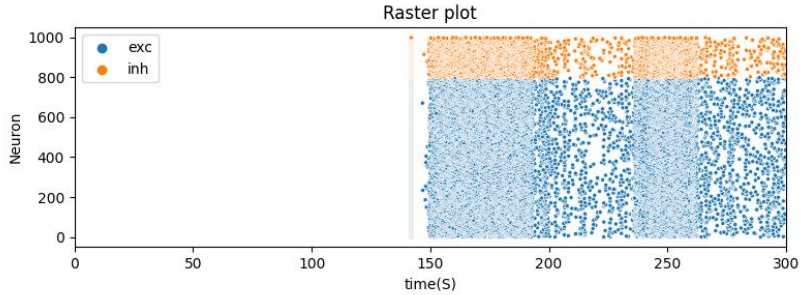
POP1: Fixed Coupling connected (p=0.01) of 800 excitatory and 200 inhibitory AELIF with the following config with J=6.5

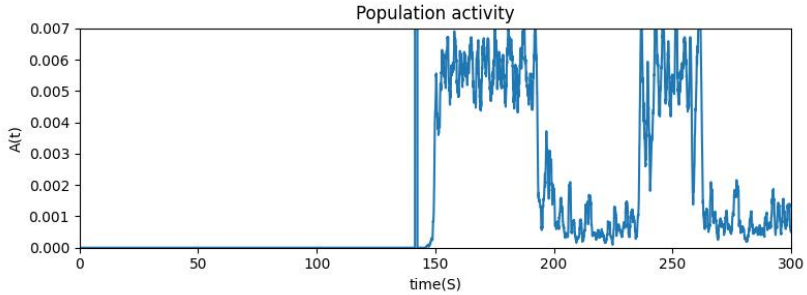
'dt=0.03125, R=10, tau=8, theta=-40, U_rest=-75, U_reset=-65, U_spike=5, ref_period=2, ref_time=0, theta_rh=-45, delta_t=2, a=0.01, b=500, tau_k=100'

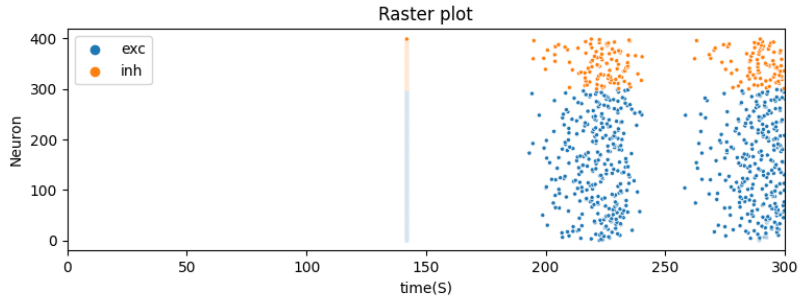
POP2: Fully Connected 300 excitatory and 100 inhibitory AELIF with the same config with J=2.5:

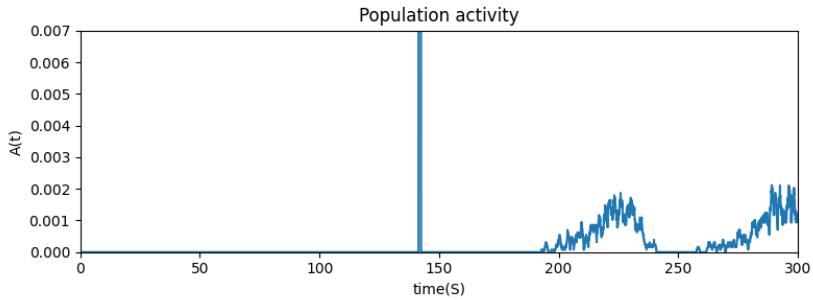
Pop1 is Gaussian connected and directed to pop2 with J=6 and sigma=1.


Time-Current
Input current (pA)
Time (ms)


Raster plot
exc
inh
Neuron
time(S)


Population activity
A(t)
time(S)


Raster plot
exc
inh
Neuron
time(S)


Population activity
A(t)
time(S)