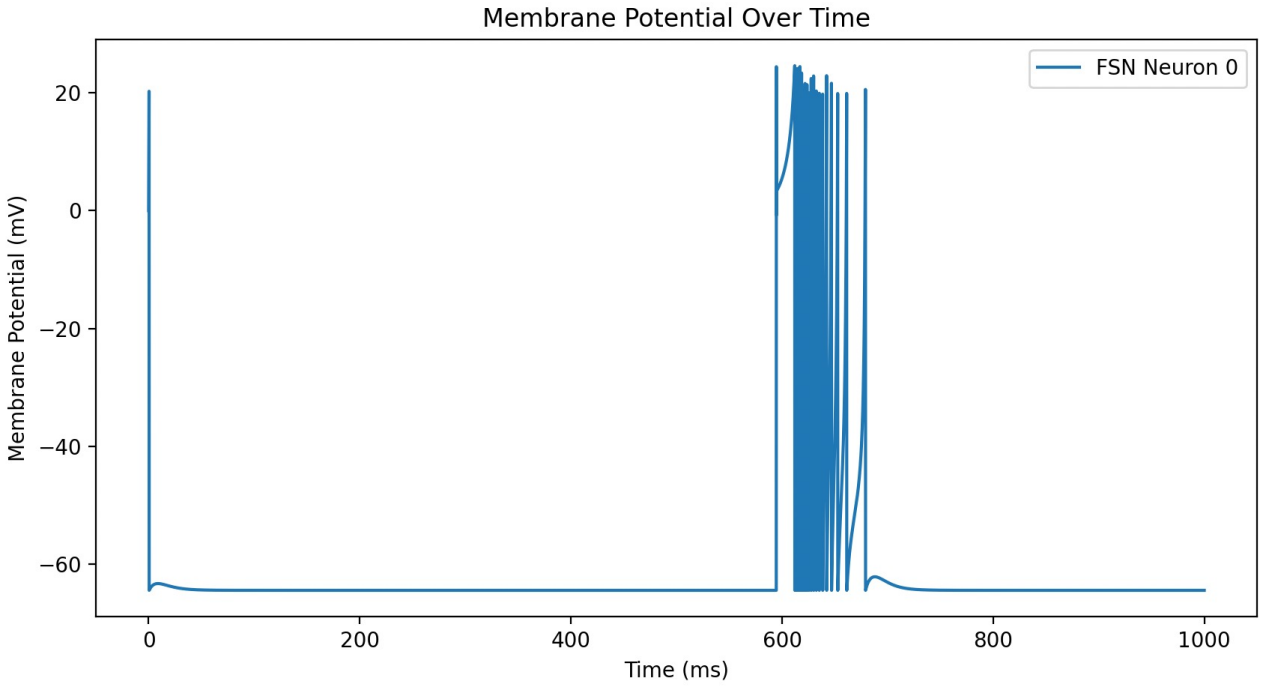
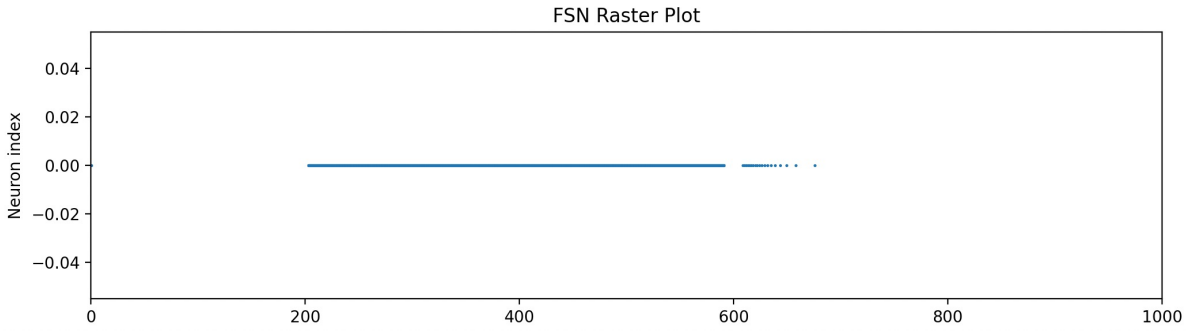
Neuron Model Test

CTX-FSN



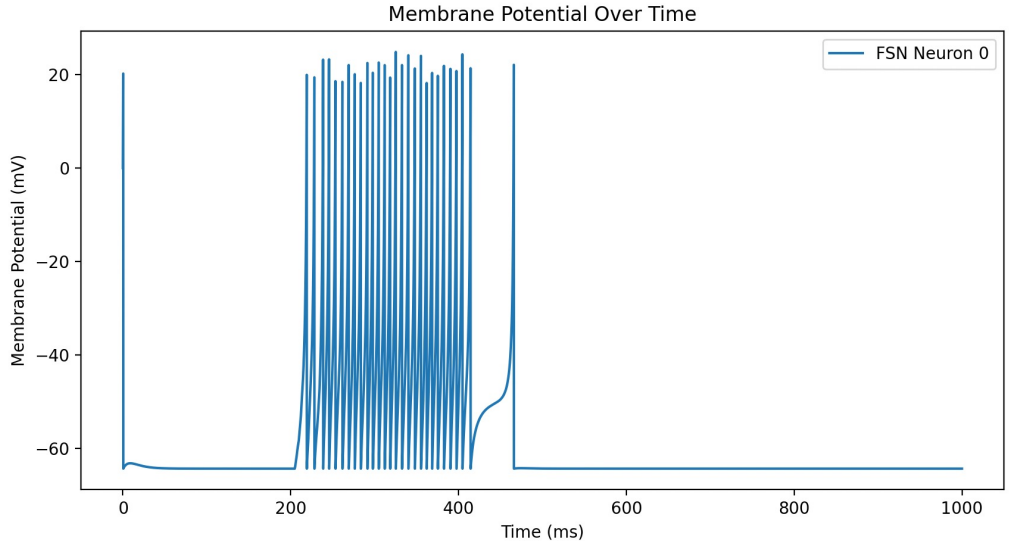


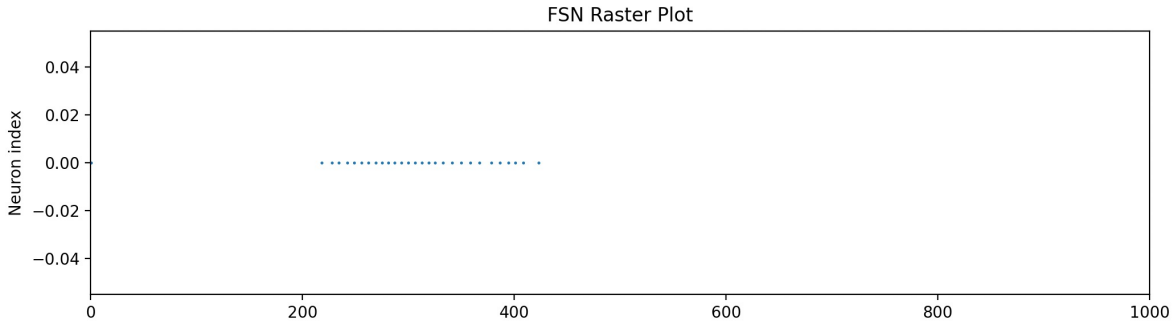
- Cortex, fsn 모두 1개씩만 연결 (0*Hz + (t >= 200*ms) * (t < 400*ms) * 787*Hz)
- 기존 코드에서 Isyn의 부호 변경-> excitatory input 받을 때 membrane potential 증가
- 멤브레인이 th에 도달 안했는데 firing 되는 **오류** 발생
  - g 업데이트 단위 수정 후 정상화

Neuron Model Test

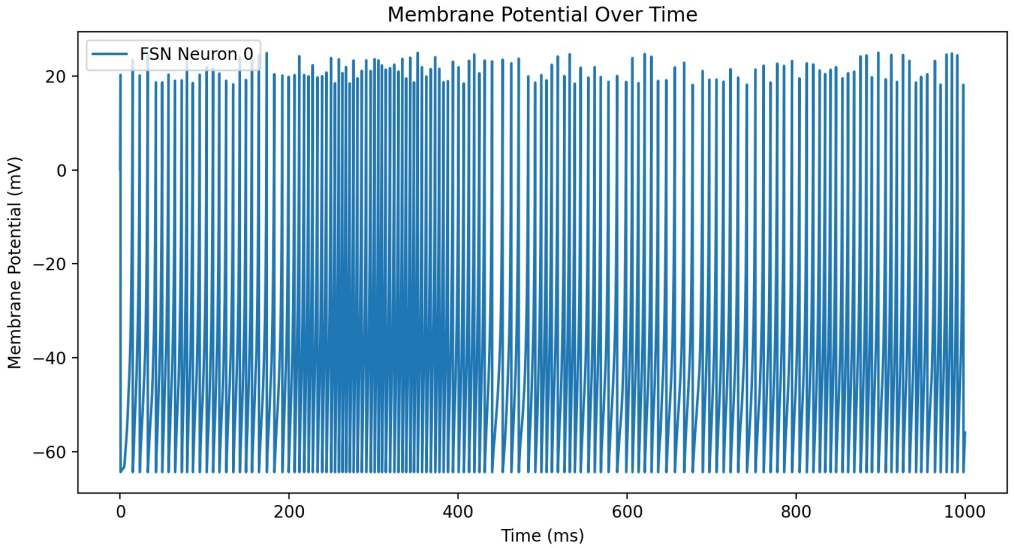
CTX-FSN

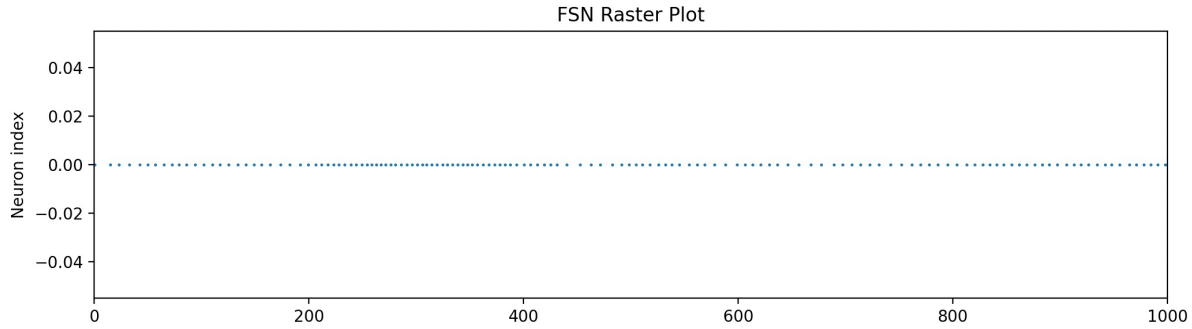
❖ **g 단위 오류 수정 후 plot**





① CTX, FSN 모두 1개씩만 연결:0*Hz + (t >= 200*ms) * (t < 400*ms) * 787*Hz



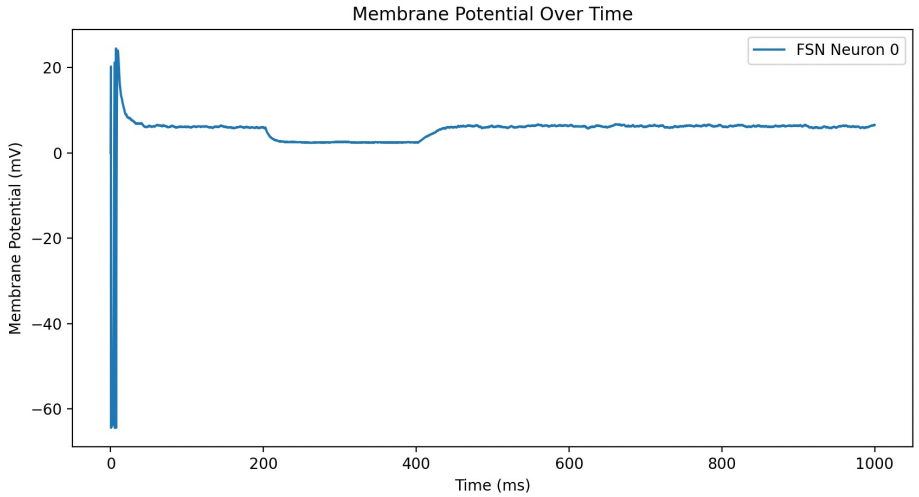


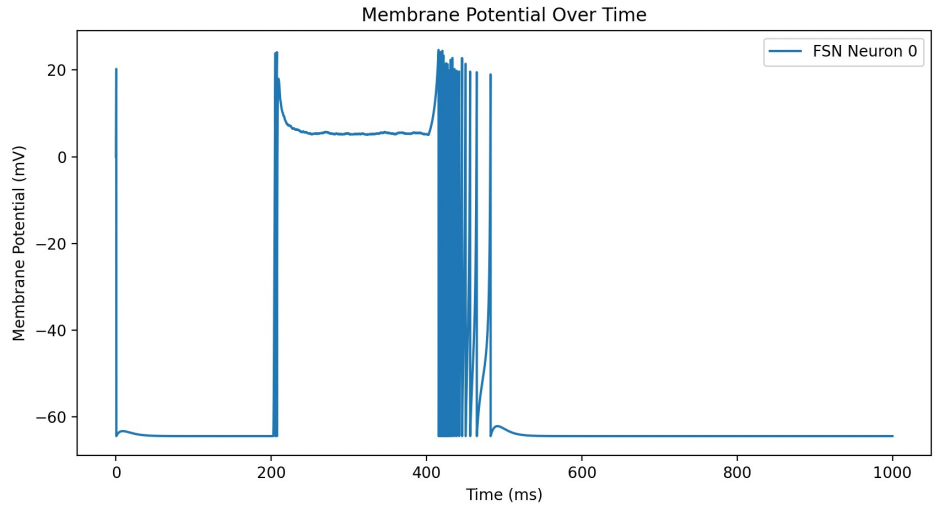
② CTX, FSN 모두 1개씩만 연결: 646*Hz + (t >= 200*ms) * (t < 400*ms) * 787*Hz

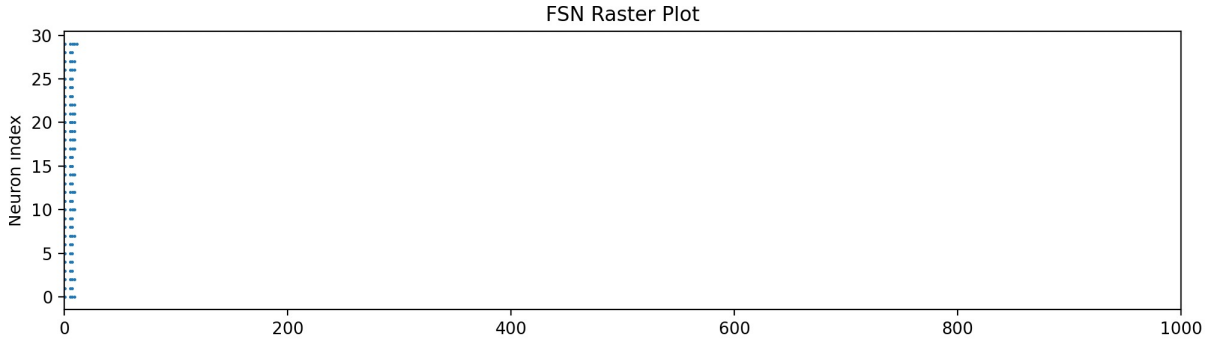
Neuron Model Test

CTX-FSN

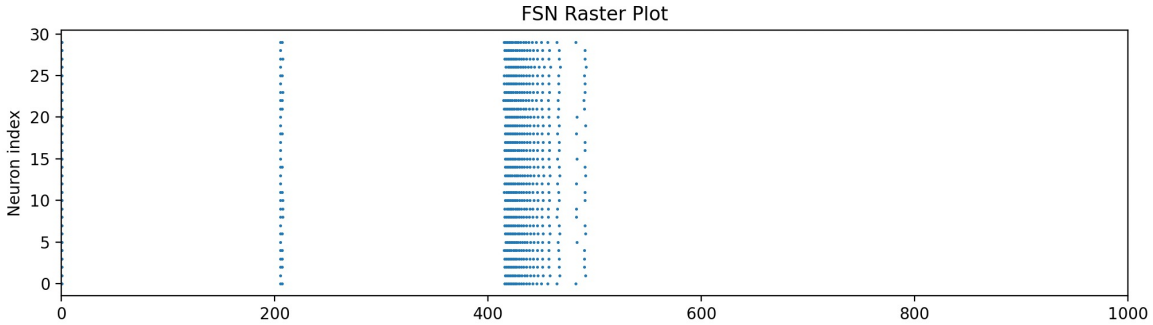
❖ 모든 조건이 똑같고 N만 다른 상황에서 excitation을 줬을 때 내려가는 패턴 보임







- CTX(100), FSN(510), p = 0.8, **w = 1**
- 646*Hz + (t >= 200*ms) * (t < 400*ms) * 787*Hz

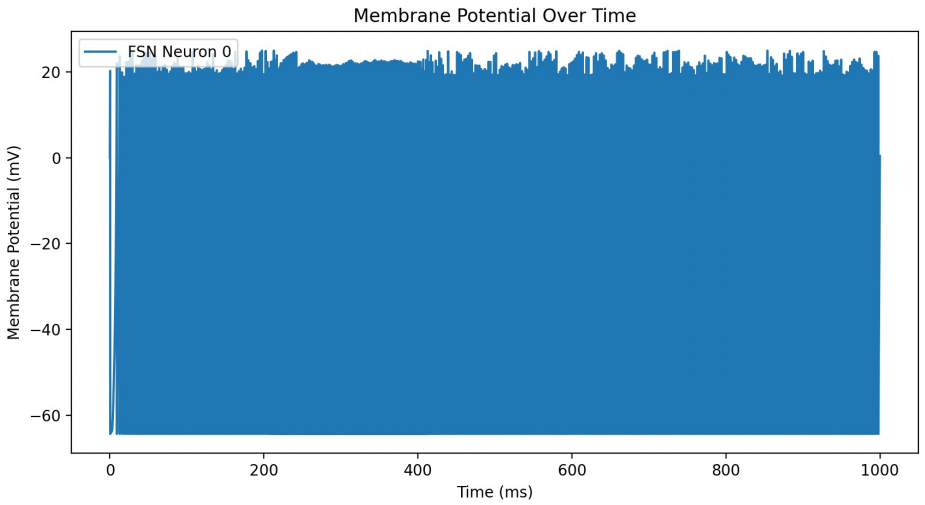


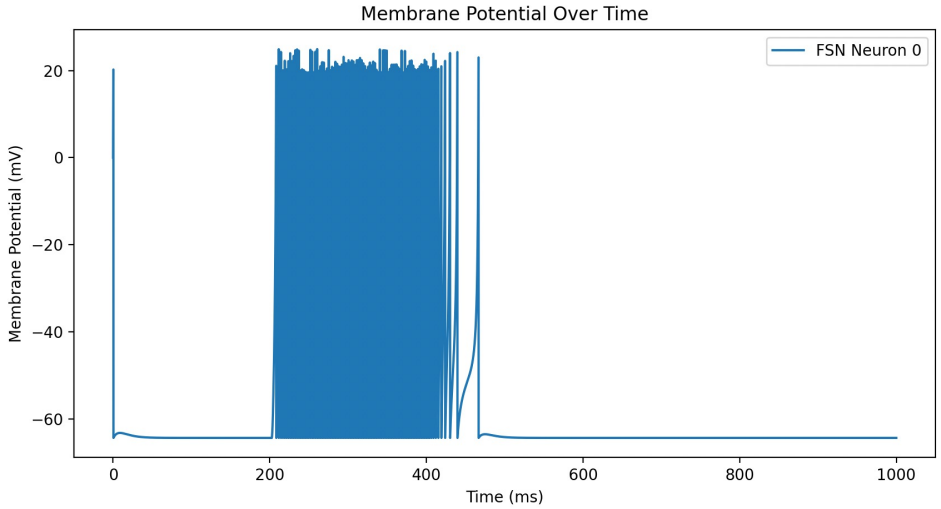
- CTX(100), FSN(510), p = 0.8, **w = 1**
- 0*Hz + (t >= 200*ms) * (t < 400*ms) * 787*Hz

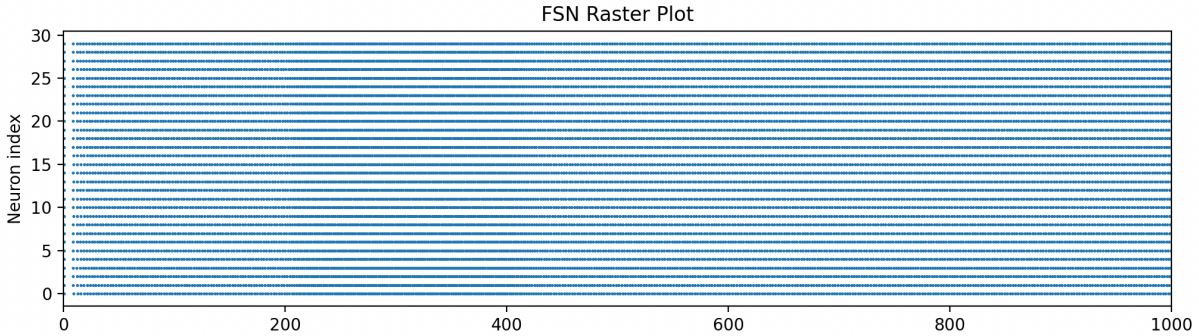
Neuron Model Test

CTX-FSN

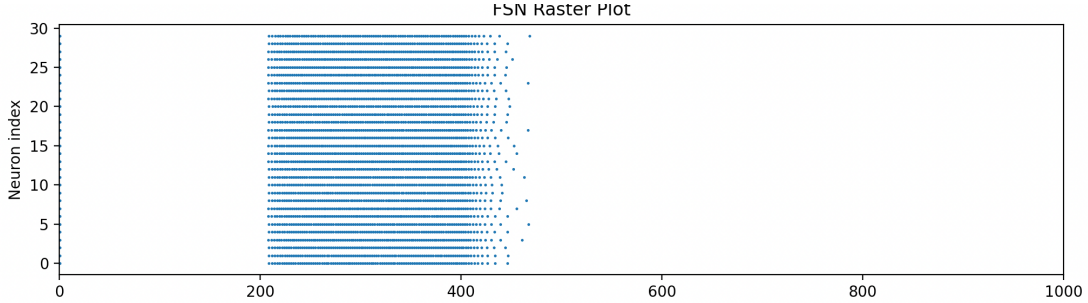
❖ Weight 값을 축소해 해결







- CTX(100), FSN(510), p = 0.8, **w = 1**
- 646*Hz + (t >= 200*ms) * (t < 400*ms) * 787*Hz

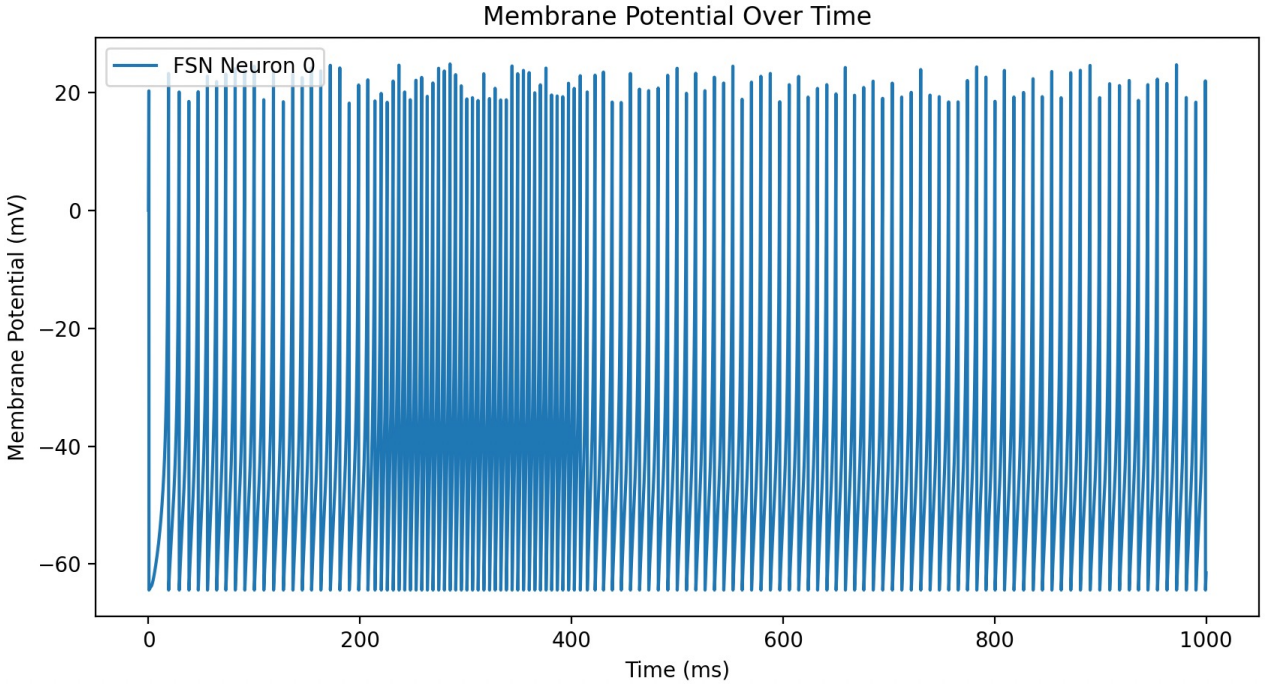


- CTX(100), FSN(510), p = 0.8, **w = 0.1**
- 0*Hz + (t >= 200*ms) * (t < 400*ms) * 787*Hz

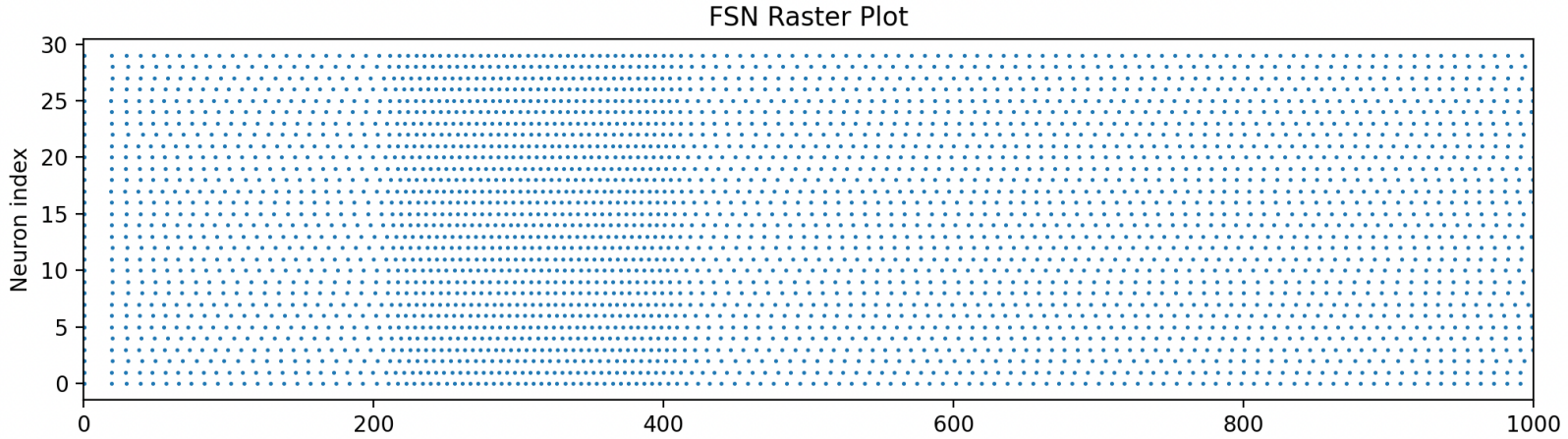
- 입력 값을 646으로할 경우 weight 더 줄여서 수행

Neuron Model Test

CTX-FSN

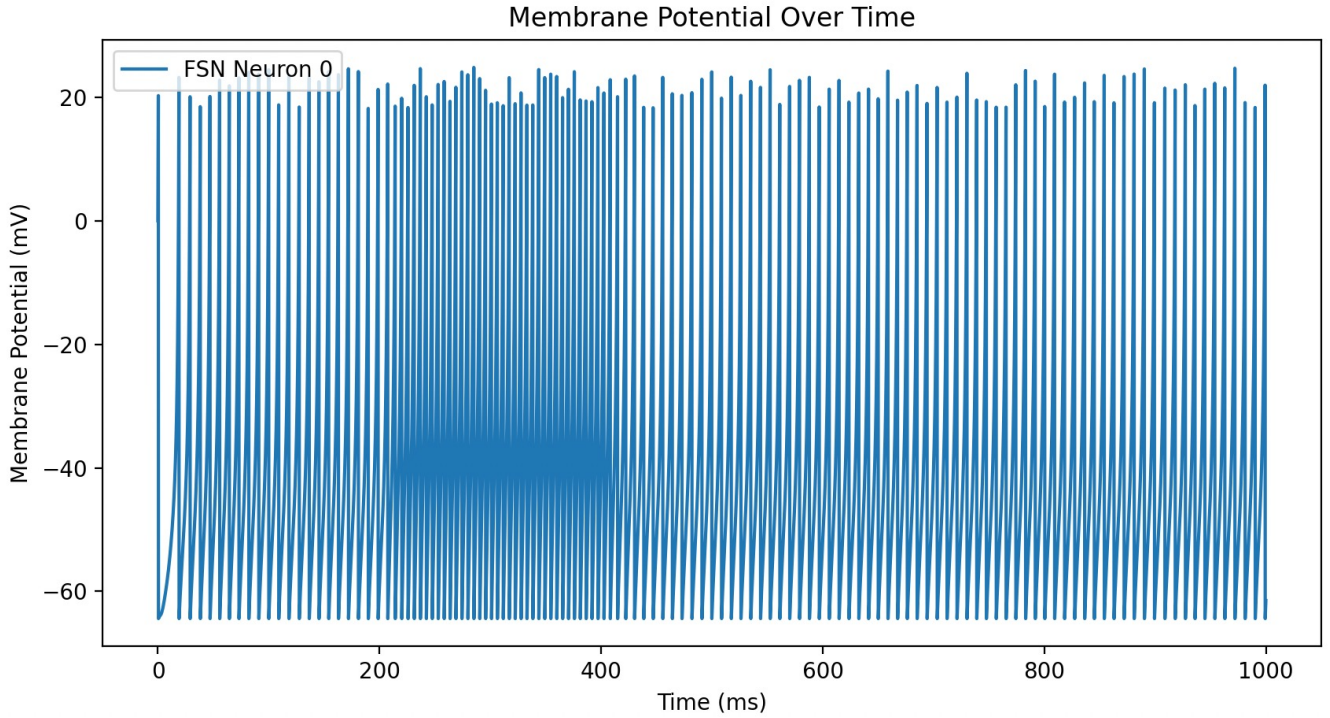


- CTX(100), FSN(510), p = 0.8, **w = 0.01**
- 646*Hz + (t >= 200*ms) * (t < 400*ms) * 787*Hz

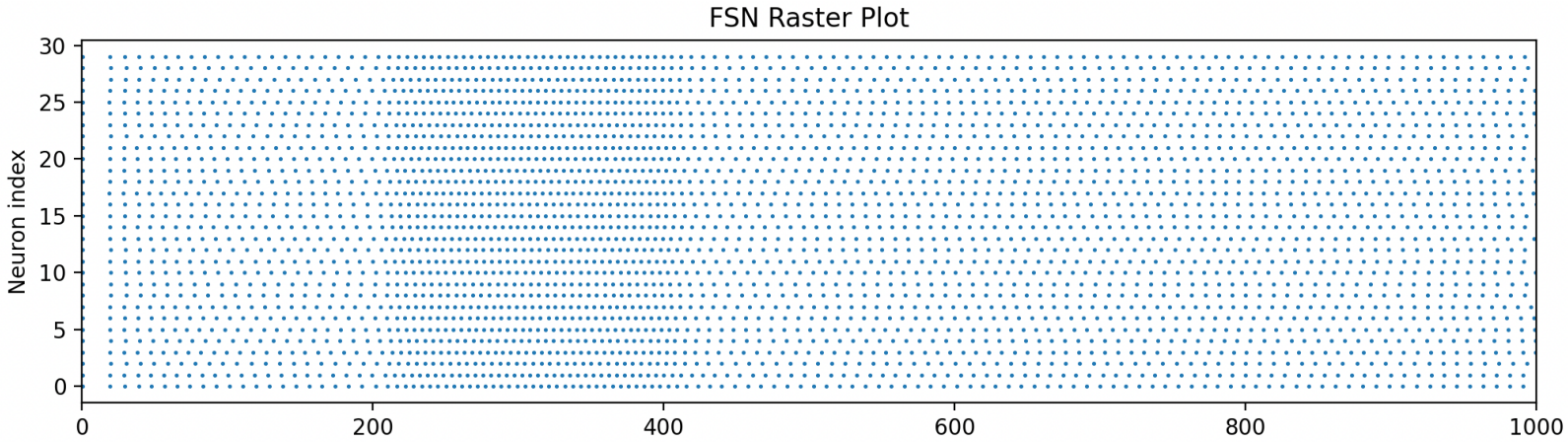


Neuron Model Test

CTX-FSN-FSN



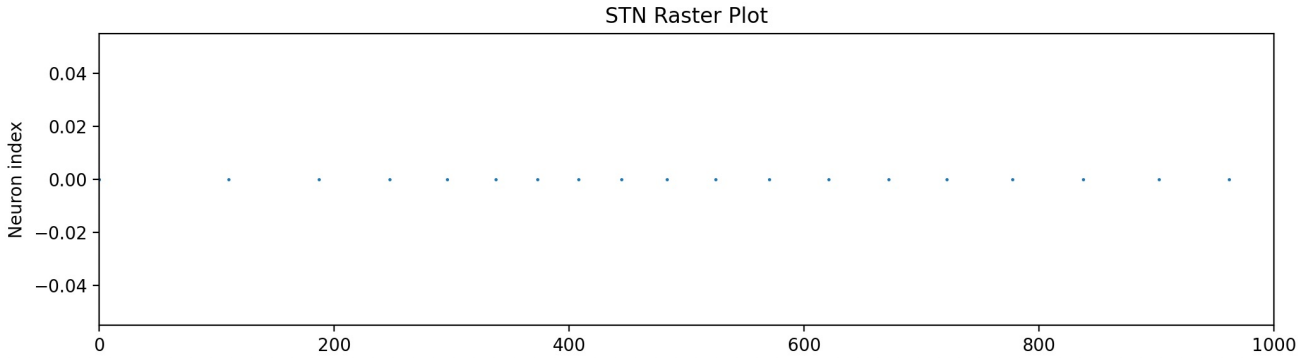
- Cortex(100), fsn(510), p = 0.8, w = 0.01
- (646*Hz + (t >= 200*ms) * (t < 400*ms) * 787*Hz)

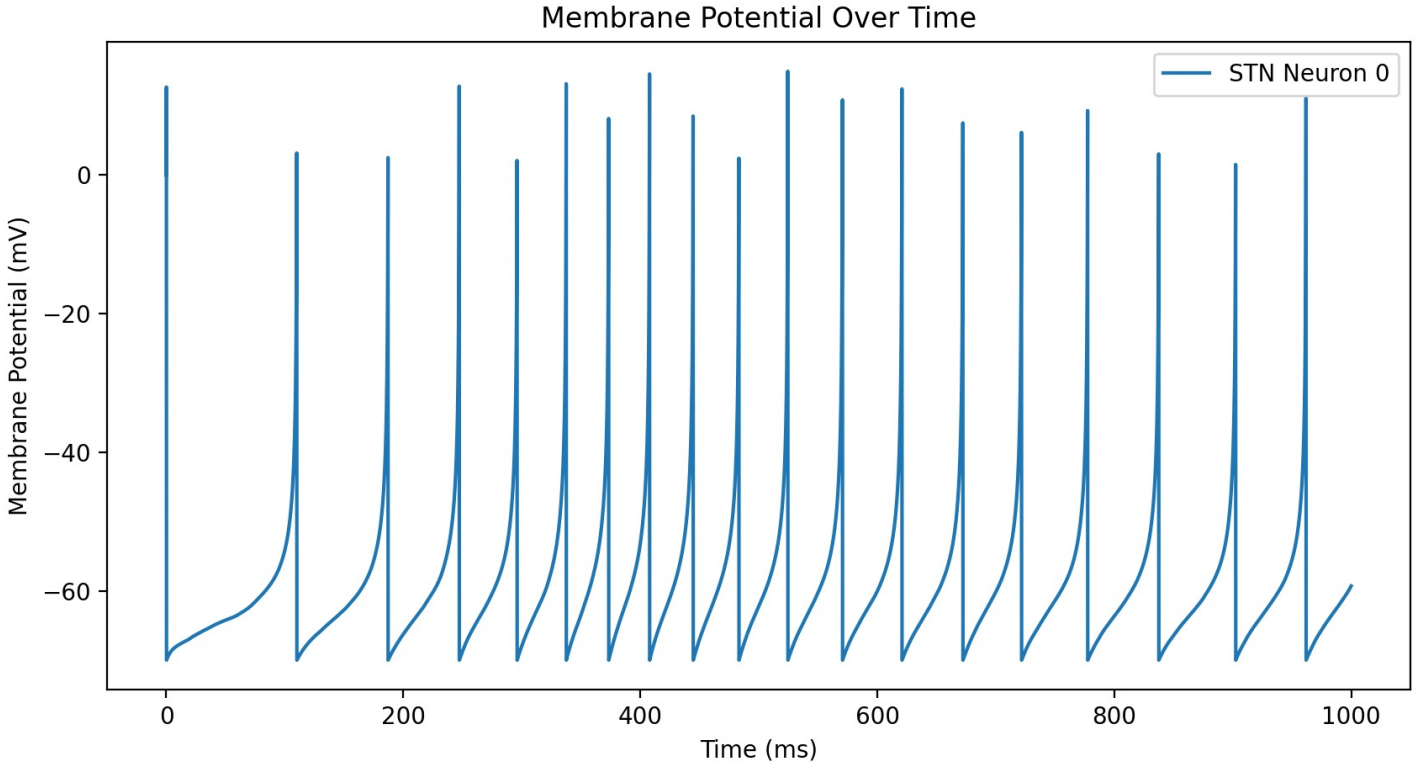


Neuron Model Test

CTX-STN

❖ N = 1





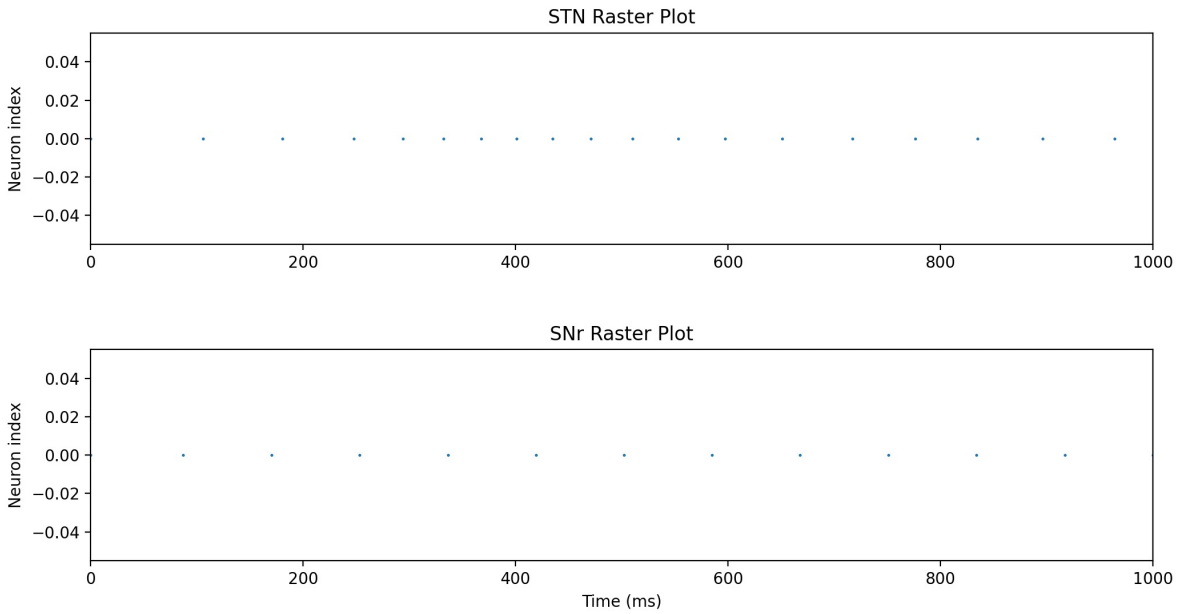
N = 1

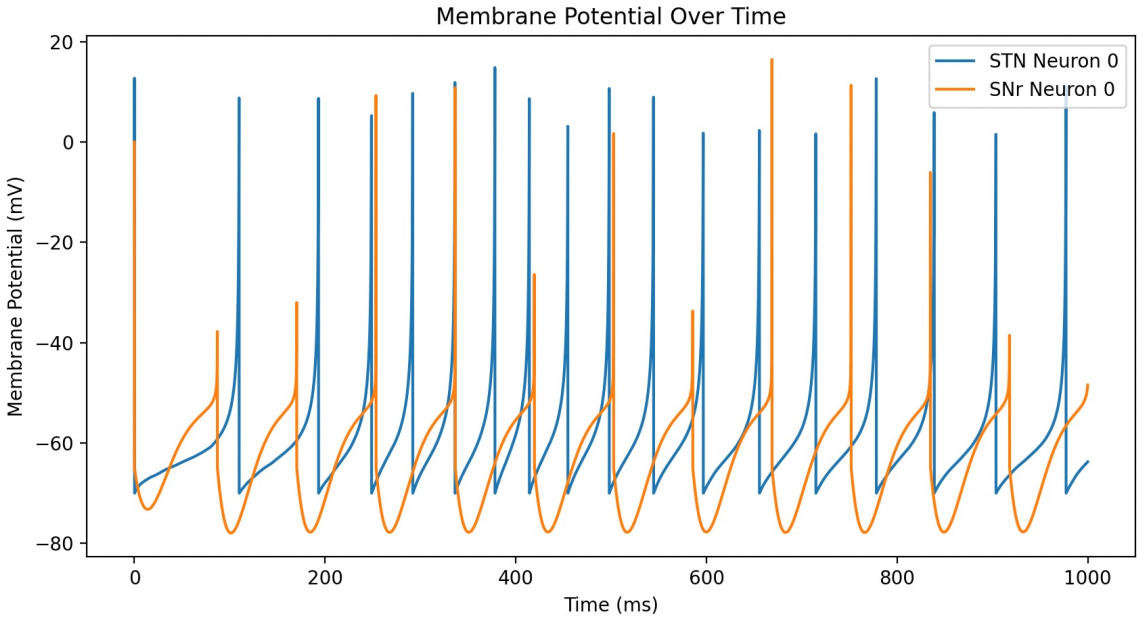
- CTX(1), STN(1), p = 1, w = 0.01
- 170*Hz + (t >= 200*ms) * (t < 400*ms) * 250*Hz

Neuron Model Test

CTX-STN-SNr

❖ N = 1



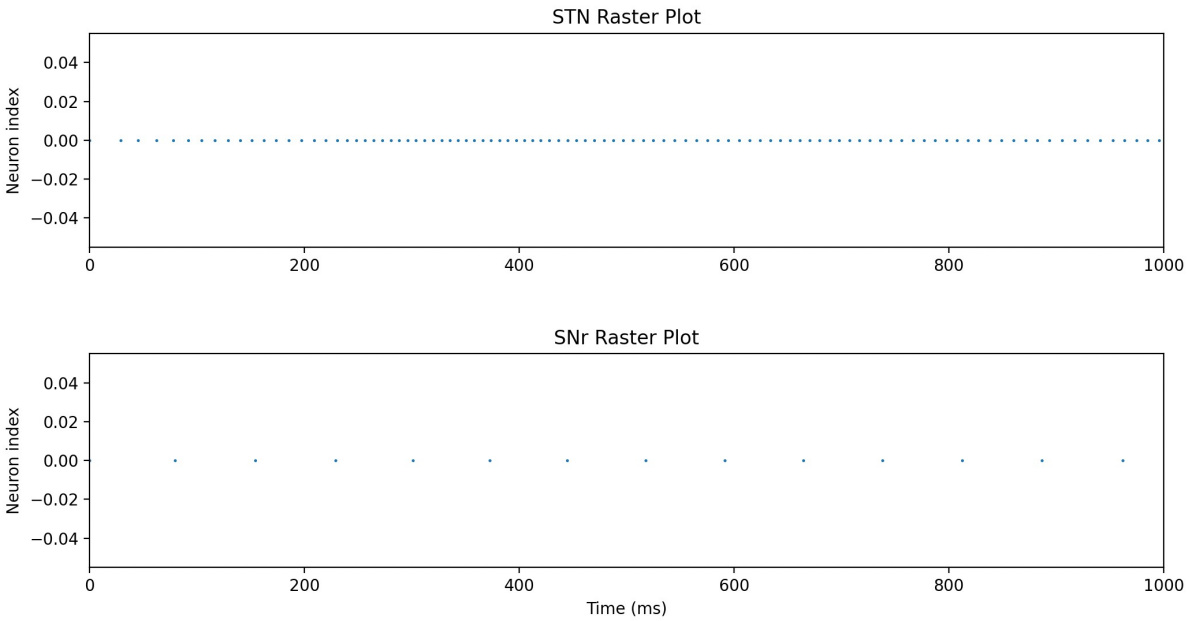


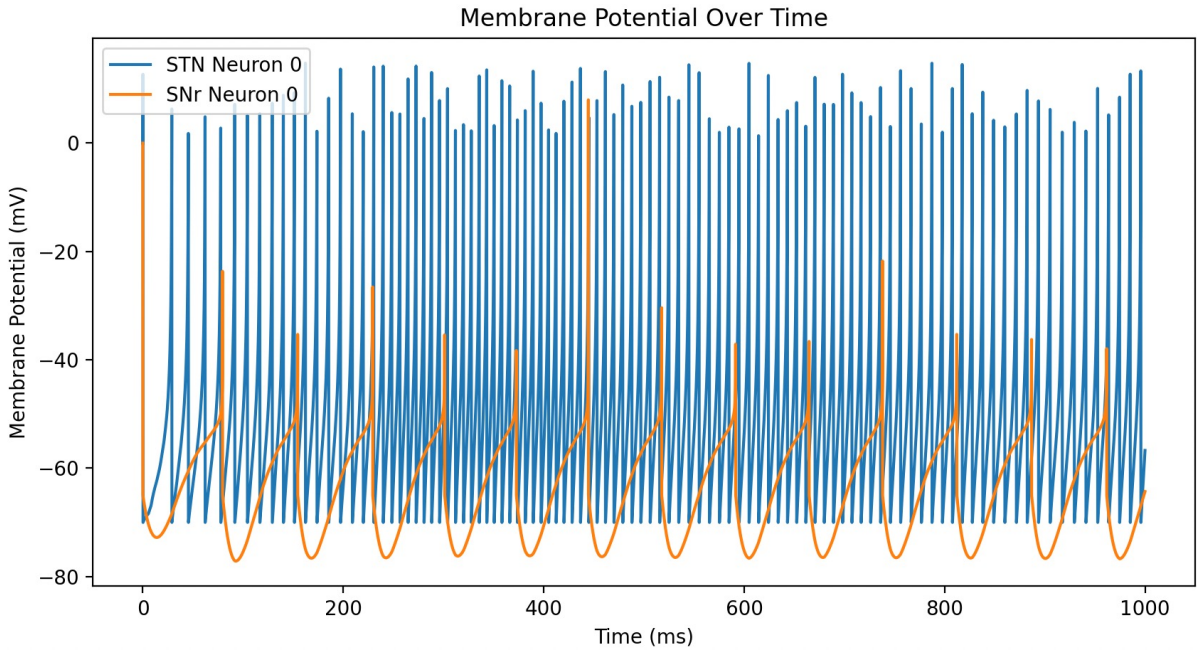
- CTX(1), STN(1), SNr(1), p = 1, w = 0.01
- 170*Hz + (t >= 200*ms) * (t < 400*ms) * 250*Hz

Neuron Model Test

CTX-STN-SNr

❖ N = 1, weight 업데이트





- Cortex(1), stn(1), snr(1), p = 1, **w = 0.1**
- 170*Hz + (t >= 200*ms) * (t < 400*ms) * 250*Hz

Future Works

- 기존에 excitatory한 input을 받는 상황에서 발생하는 오류를 해결하기 위해 수식 수정
- 다른 모델을 사용하는 CTX-FSN, CTX-STN-SNr 네트워크를 통해 각 네트워크의 오류를 찾고 수정함
- 또한 아래 이미지와 같이 input type을 다르게 하여 membrane 변화 확인 예정 (hyper, direct, indirect)