1. There is only one Ih channel gene [1, 2]
2. Also known as DMIH (drosophila homologue of HCN channels)

1 R5 Model

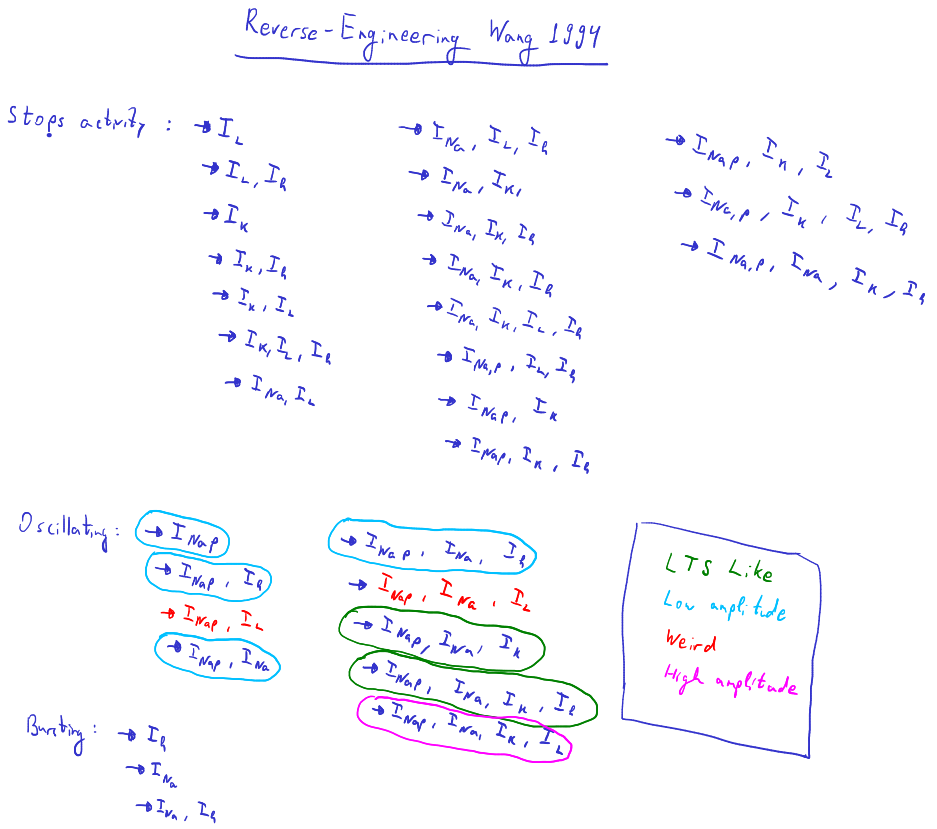
Contents

- Wang 1994 model simulations
  - Blocking T-Type Ca^{2+} channel destroys LTS
  - Removing h current does not affect dynamics. H current is not necessary in the model
- Resting membrane potential of R5 is $\approx -49mV$ [3].

1.1 Model

1.2 Appendix

1.2.1 Reverse Engineering Wang 1994 Model



→ I_{NaP}, I_L, I_K, and I_T are necessary & sufficient for bursting

→ I_T, I_L are necessary and sufficient for LTS

$I_{Na,P}$ – B

I_{Na} – T

I_K – B, T

I_L – B, LTS

I_T – B, LTS

I_h – ?

Inward ($I<0$): I_T, I_{Na}, $I_{Na,P}$, I_h

Outward ($I>0$): I_K, I_L, (I_h)

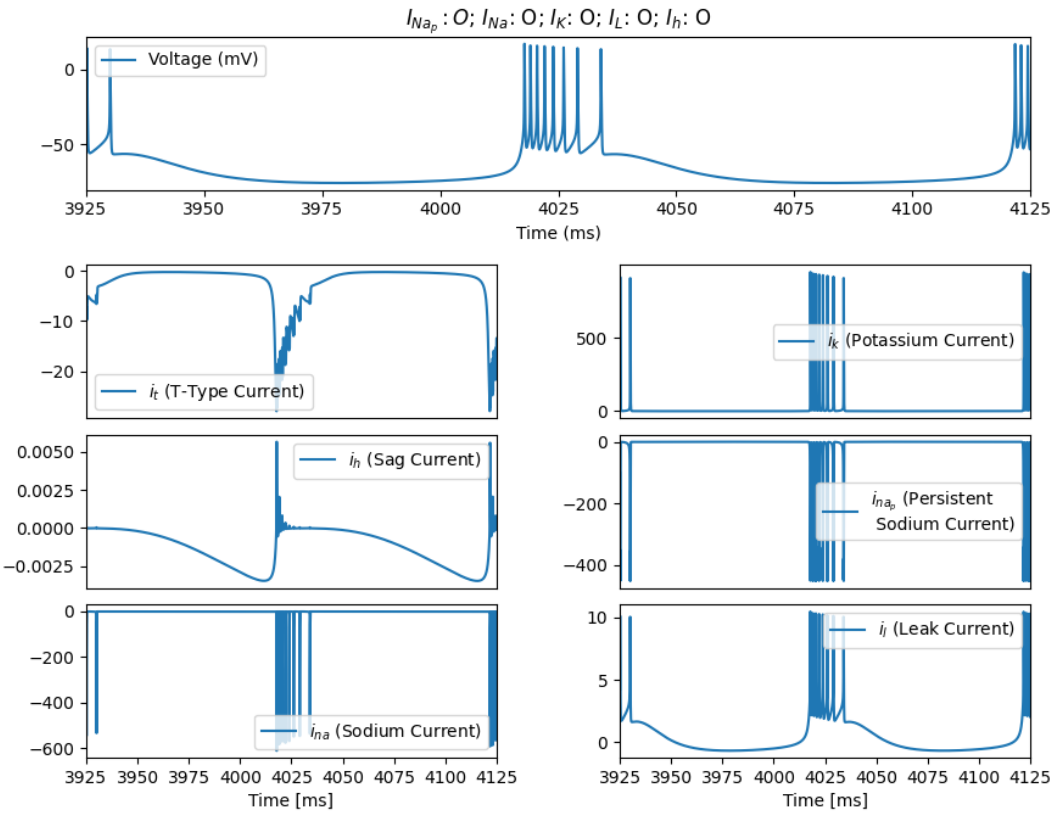
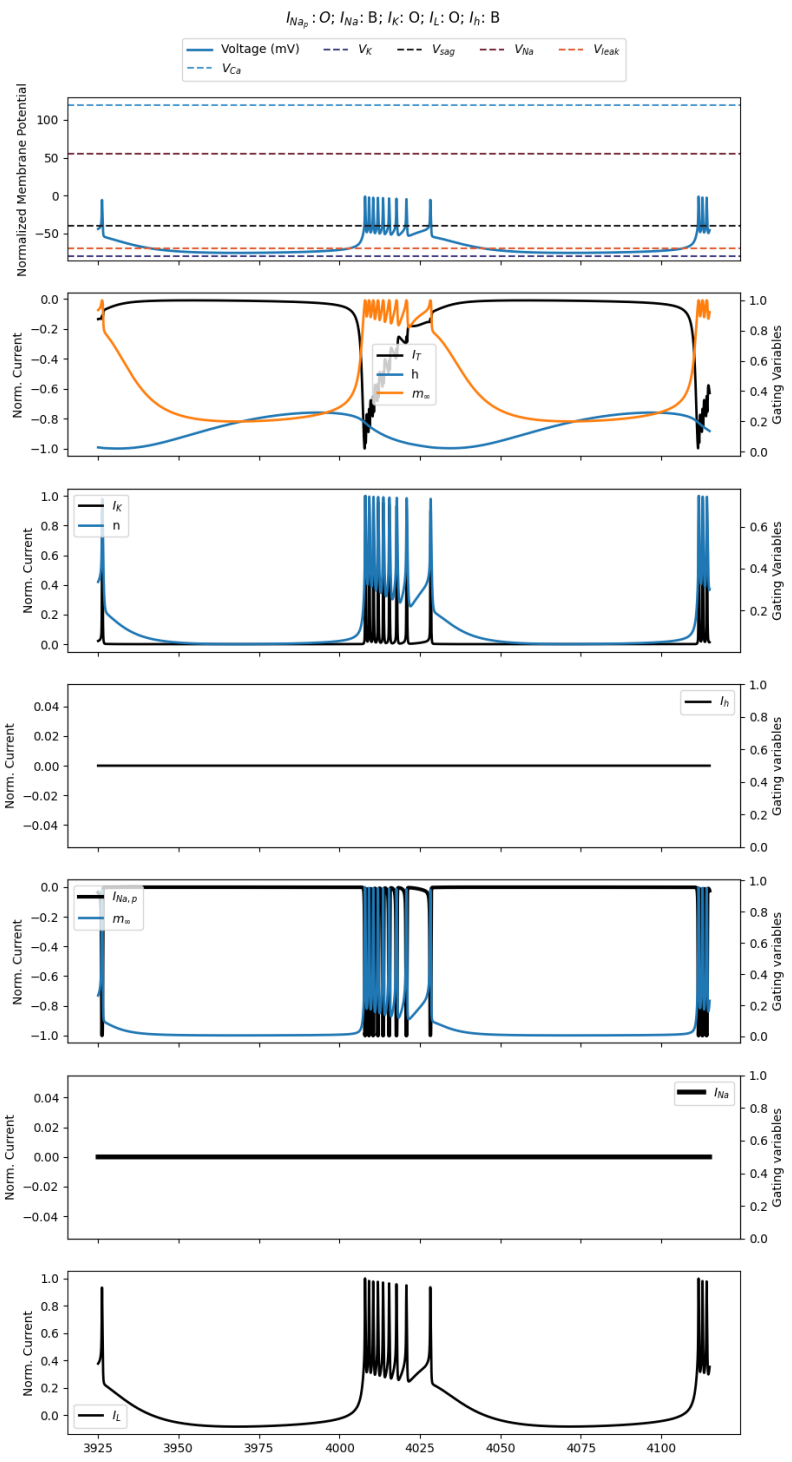

I_{Na_p}: O; I_{Na}: O; I_K: O; I_L: O; I_h: O
Voltage (mV)
Time (ms)
i_t (T-Type Current)
i_k (Potassium Current)
i_h (Sag Current)
i_{na_p} (Persistent Sodium Current)
i_{na} (Sodium Current)
i_l (Leak Current)
Time [ms]
Time [ms]

Figure 1


I_{Na_p}: O; I_{Na}: B; I_K: O; I_L: O; I_h: B
Voltage (mV)
V_K
V_{sag}
V_{Na}
V_{leak}
V_{Ca}
Normalized Membrane Potential
Norm. Current
Gating Variables
I_T
h
m_∞
I_K
n
I_h
$I_{Na,p}$
m_∞
I_{Na}
I_L
3925
3950
3975
4000
4025
4050
4075
4100

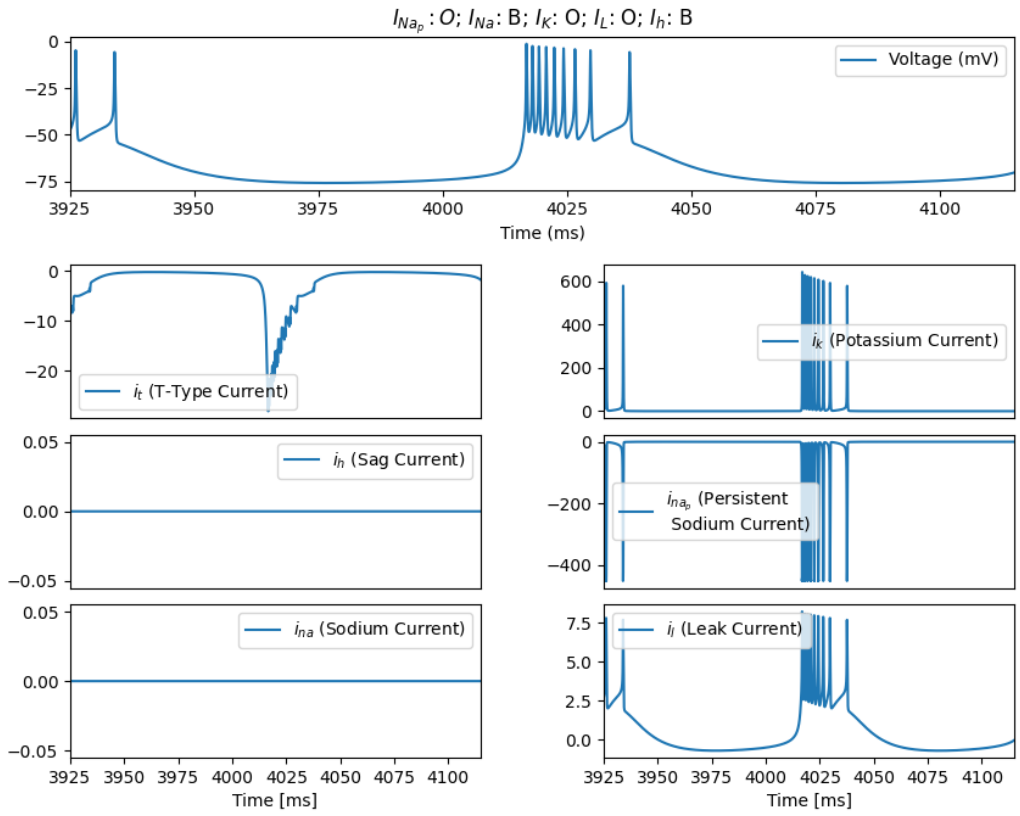

I_{Na_p}: O; I_{Na}: B; I_K: O; I_L: O; I_h: B
Voltage (mV)
Time (ms)
i_t (T-Type Current)
i_k (Potassium Current)
i_h (Sag Current)
i_{na_p} (Persistent Sodium Current)
i_{na} (Sodium Current)
i_l (Leak Current)
Time [ms]
Time [ms]

Figure 2

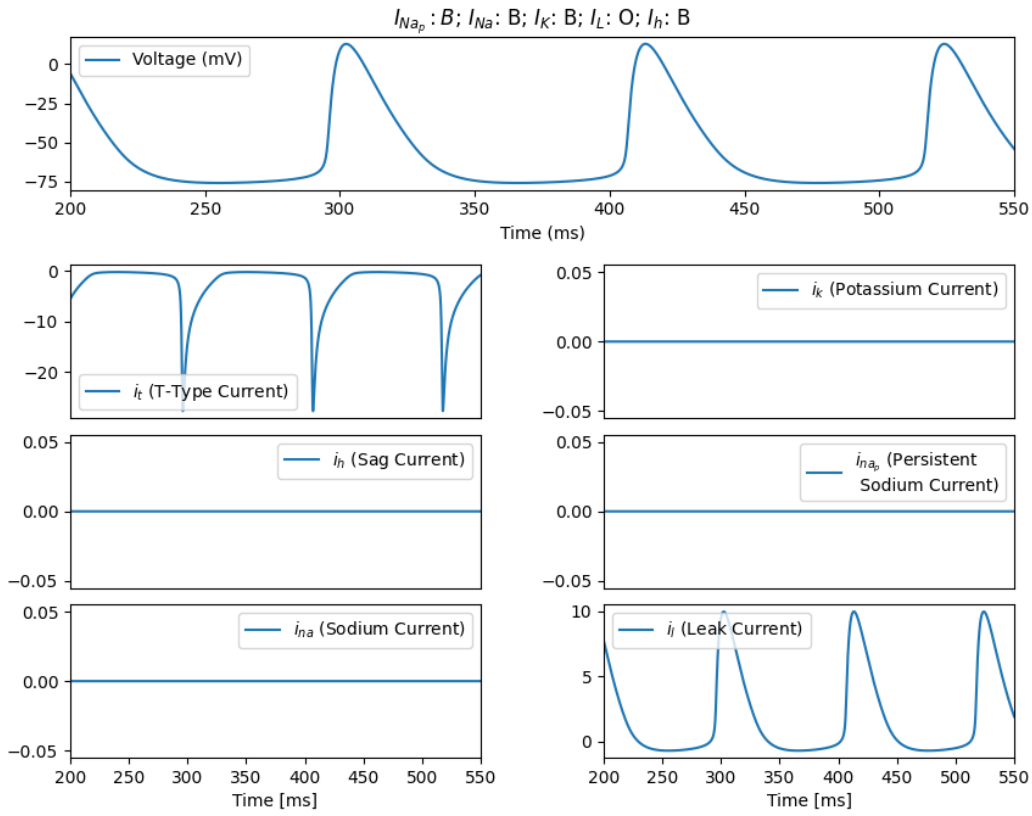

I_{Na_p}: B; I_{Na}: B; I_K: B; I_L: O; I_h: B
Voltage (mV)
Time (ms)
i_t (T-Type Current)
i_k (Potassium Current)
i_h (Sag Current)
i_{na_p} (Persistent Sodium Current)
i_{na} (Sodium Current)
i_l (Leak Current)
Time [ms]
Time [ms]

Figure 3