

Homework 1: Hodgkin-Huxley(HH) model

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选择 E_{Na} 为调节的参数, 通过选取不同的参数值, 画出 HH 模型的动作电位图如下。

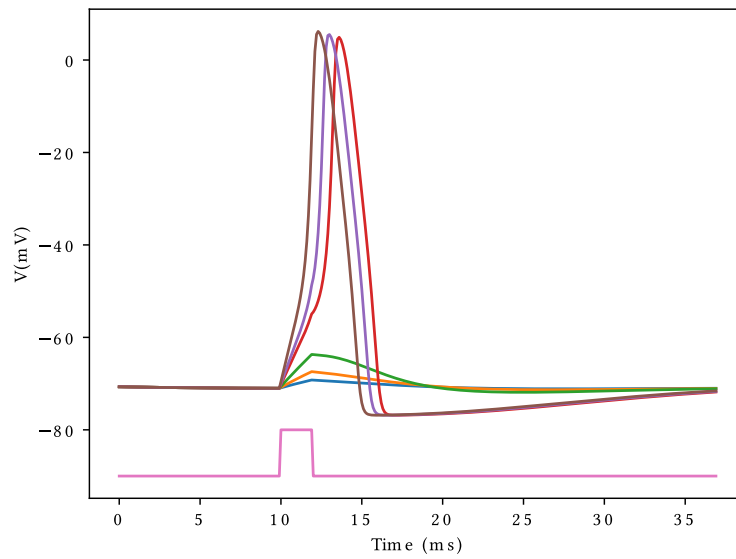


Figure 1: $E_{Na} = 10\text{mV}$

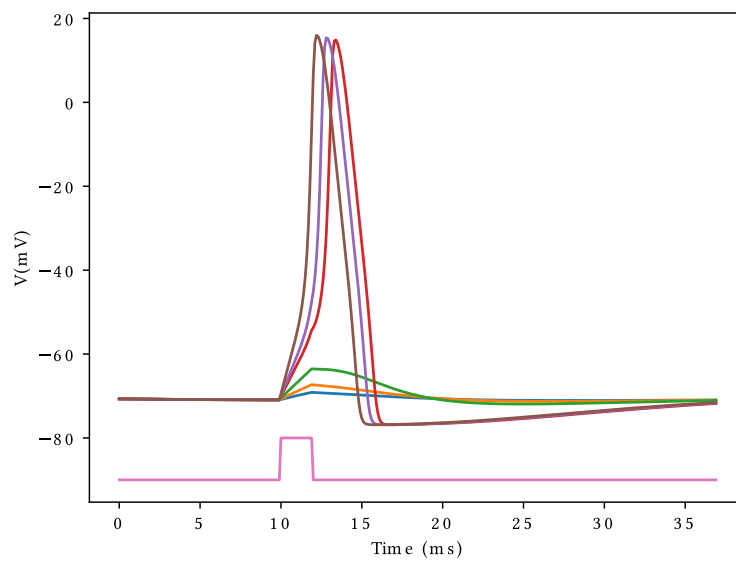


Figure 2: $E_{Na} = 20\text{mV}$

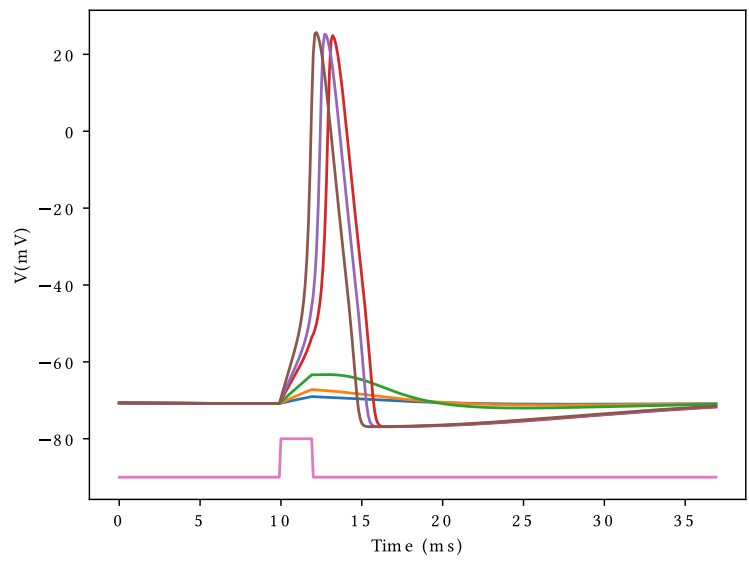


Figure 3: $ENa = 30\text{mV}$

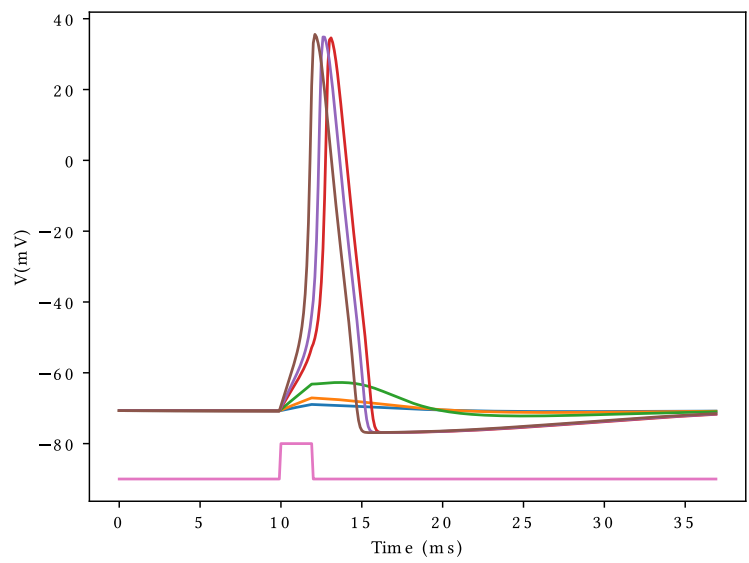


Figure 4: $ENa = 40\text{mV}$

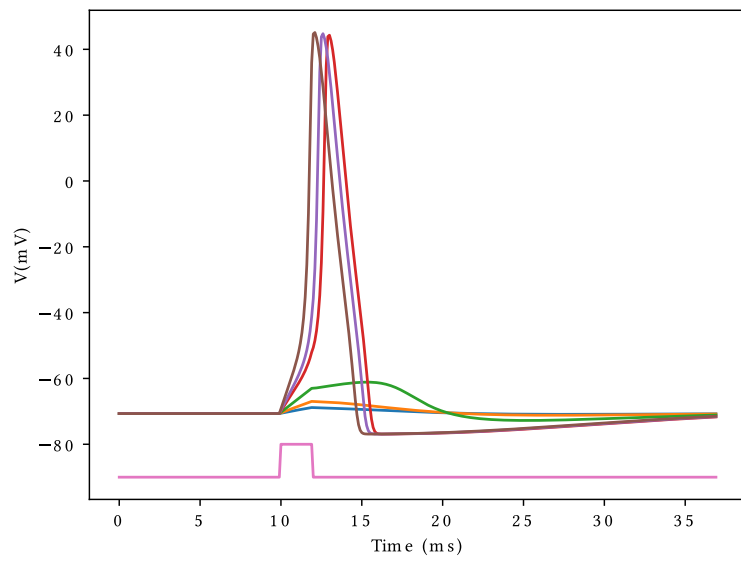


Figure 5: $E_{Na} = 50\text{mV}$

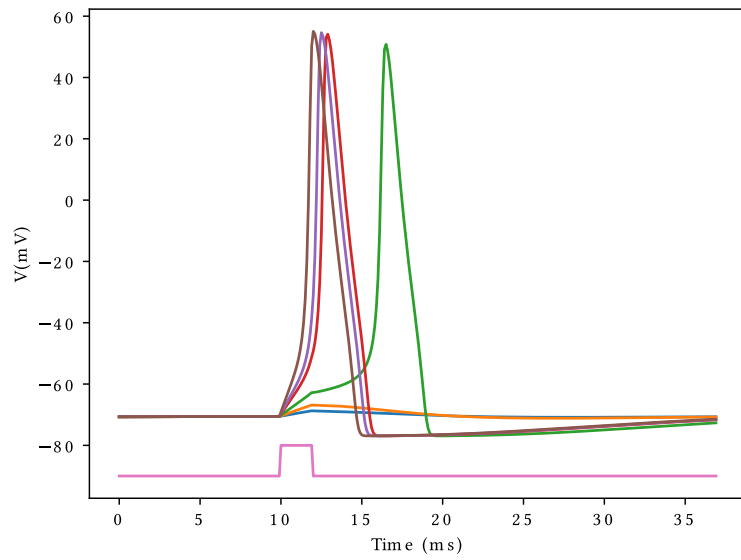


Figure 6: $E_{Na} = 60\text{mV}$

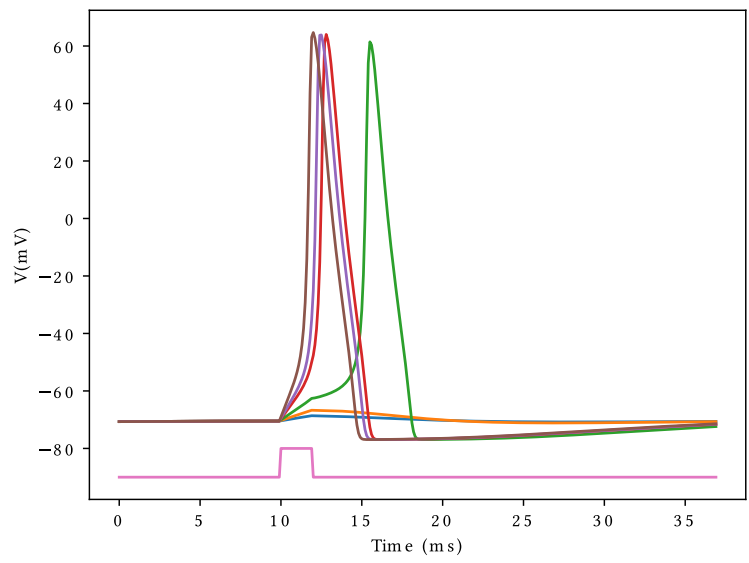


Figure 7: $E_{Na} = 70\text{mV}$

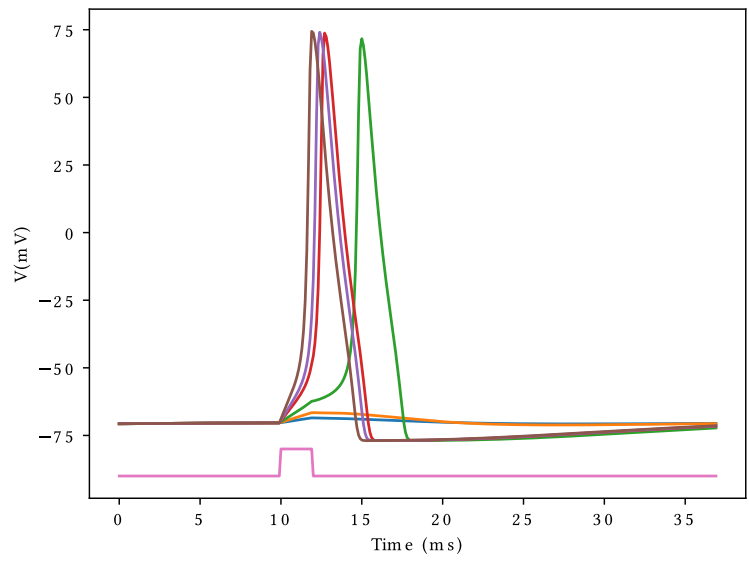


Figure 8: $E_{Na} = 80\text{mV}$

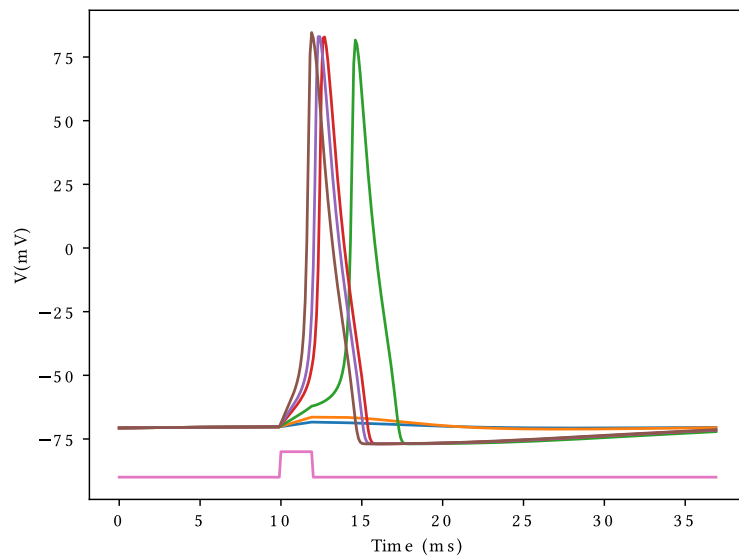


Figure 9: $E_{Na} = 90mV$

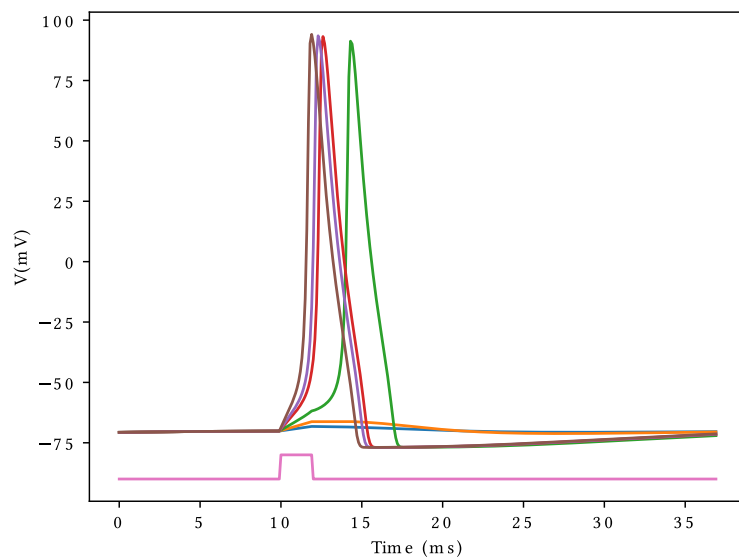


Figure 10: $E_{Na} = 100mV$

几个规律:

- 由十幅图的对比可以很明显的看出，随着 E_{Na} 的增大，动作电位的幅值增大，峰变得更加尖锐。
- 同时还发现，在 E_{Na} 从 50mV 到 60mV 的时候，绿色的线被“激发”，也就是绿线所对应的输入达到了阈值从而激发了动作电位，而橙线、蓝线始终没有被激发
- 动作电位的幅值几乎与输入无关（几个峰几乎等高）