Quiz 4.1: 2D Model

problem

0 points possible (ungraded)

Assumption: In order to reduce a detailed compartmental neuron model to two dimensions we have to assume that

- [ ] dendrites can be approximated as passive ✔ 没有cable equation的效应
- [x] the neuron model has no dendrite
- [ ] the neuron model has at most 2 types of ion channels
- [ ] all gating variables are fast
- [ ] no gating variable is fast
- [x] gating variables fall in two groups: those that are fast and those that are slow ✔
- [ ] at least one of the ion channels is inactivating
- [ ] the neuron does not generate spikes

✖

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ℹ Answers are displayed within the problem

problem

0 points possible (ungraded)

A biophysical point model with 3 ion channels, each with activation and inactivation, has a total number of equations equal to

- [ ] 3
- [ ] 4
- [x] 6
- [ ] 7 ✔ 还有一个电压的主方程
- [ ] 8 or more

✖

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Separation of time scales

0 points possible (ungraded)
We start with two equations

$$\tau_1 \frac{dx}{dt} = -x + I(t)$$

$$\tau_2 \frac{dy}{dt} = -y + x^2 + A$$

We assume that $\tau_1 \ll \tau_2$. In this case a reduction of dimensionality

- [ ] is not possible
- [x] is possible and the result is $\tau_2 \frac{dy}{dt} = -y + [I(t)]^2 + A$ ✔ 我乱猜的
- [x] is possible and the result is $\tau_1 \frac{dx}{dt} = -x + x^2 + A$

✖

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Discussion

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