Quiz 4.2: Separation of Time Scales

Separation of time scales

0 points possible (ungraded)

We start with two equations

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

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

- ☐ if $\tau_1 \ll \tau_2$ then the system can be reduced to $\tau_2 \frac{dy}{dt} = -y + [y + I(t)]^2 + A$ ✔

- ☐ if $\tau_2 \ll \tau_1$ then the system can be reduced to $\tau_1 \frac{dx}{dt} = -x + x^2 + A + I(t)$ ✔

- ☑ none of above is correct

✖

Submit   You have used 1 of 1 attempt

ℹ Answers are displayed within the problem

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0 points possible (ungraded)

A channel with gating variable r, given by

$$\tau_1 \frac{dr}{dt} = -r + r_0(u)$$

influences the voltage

$$\tau_2 \frac{du}{dt} = -(u - u_0) + r^2 A$$

We assume that $\tau_1 \ll \tau_2$

IN this case a reduction of dimensionality

- ☐ is not possible

- ☑ is possible and the result is $\tau_2 \frac{du}{dt} = -u + u_0 + [r_0(u)]^2 A$

- ☐ is possible and the result is $\tau_1 \frac{dr}{dt} = -r + r_0(u_0 + r^2 A)$

✔

Submit   You have used 1 of 1 attempt

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