ex01_Q1

(a) action potentials

(b) This happens when the synaptic time constant (τ_s) is sufficiently large. In that context, it is only the firing rate of of the pre-synaptic neuron that matters, and the specific spike timing is far less important. Also, see the tutorial video (at 45:00) for an extended explanation.

(c)

- LIF • Only models the dynamics of sub-threshold membrane potential.
- HH • Is a non-linear model.
- LIF • Does not model the spikes, but simply determines spike times.
- HH • Models the dynamics of the electrical spikes.
- LIF, HH • Includes a term for current leakage.
- HH • Involves the interaction of multiple dynamic variables.

(these answers are based on excluding input current from both models)