Prof. Dr. Gregor Schöner October 19, 2017

Exercise 3, Oct 19, 2017

Read Chapter 1 "Neural Dynamics" by Gregor Schöner, Hendrik Reimann, and Jonas Lins from the book "Dynamic thinking" (G Schöner, J Spencer and the DFT Research Group, Oxford University Press, 2016) (a proof of that chapter is downloadable on the course webpage).

1. Go through the Einstein argument at the beginning of the chapter. Make your own figures to make plausible that the variance of the level of activation increases in time without the $-u$ term. You can take Figure 1.8 of the chapter and expand it, annotate it, explain it. Formulate in your own words, why the $-u$ term is necessary to make neural dynamics work.

2. Around Figure 1.12 explain how input (a "stimulus") is formally represented in neural dynamics. Describe how presenting a stimulus to the sensory surface affects the temporal evolution of neural activation. Use your own words and develop your own illustrations! Also discuss and illustrate what happens when an input/stimulus is removed again. Vary the length of presentation of a stimulus and think through and illustrate what will happen then to neural activation. Is there a minimum length of presentation needed to get any positive activation?