

Computational Neuroscience: Neural Dynamics

Exercise 7, due December 12, 2024

Read the paper “Dynamic Field Theory of Movement Preparation” by Wolfram Erlhagen and Gregor Schöner (Psychological Review 109:545-572 (2002)) available on the course web page. The section of the paper about “the basic concepts of DFT” will be familiar and should be easy reading. More specific aspects begin on page 5 under the heading “Dynamic Field model of Movement Preparation” and Figure 5. You may skip the section on multidimensional fields (from page 560 on).

1. Around Figure 12, discuss the metric effect on reaction times. Explain in intuitive terms how that effect comes about in the dynamic field model, using graphical illustrations of the activation field as it evolves toward a peak for two different metric conditions (2 different forms of preshape). This may amount to expanding Figure 12 by adding plots of the “specific input” and of the activation field near the point where the field goes above threshold.
2. Describe the Simon effect and use Figure 20 to explain it. In similar fashion to the previous question, you may expand the figure by sketching the resulting activation patterns in the field under the different conditions. You may need to amplify the differences between the conditions to make the effect visually vivid.