

DFT with Cosivina: A simple neural dynamic model of selection decisions with multiple sources of specification

DFT Summer School 2021

1 Preparation

Read the paper “Dynamic Field Theory of Movement Preparation” by Erlhagen and Schöner (2002) available on the DFT webpage. You can safely drop the section “Timed Movement Initiation” and the sections on multidimensional dynamic fields. While reading, focus on the “Reaction Time Paradigm” and the “Simon Effect”.

Read part IV (pages 70-77) of the Cosivina documentation and implement the given examples on your own. You will use all components presented here in the actual project.

2 Project

The goal of this project is to build a DFT-architecture that models the Simon effect. You can start with building this basic architecture:

- Create a selective neural field. You can use the parameters from the interactive simulator for that.
- Create two Gaussian inputs that represent two possible task responses.
- Create an input that biases selection at one of the two locations and acts as a “go”-signal that is strong enough to induce a detection instability.
- Run the simulator and establish that the architecture behaves as predicted. A peak should arise at the cued location when the specific stimulus is presented, but not before that. This might require some parameter tuning.

Now you can add another input that models the Simon-effect and proceed with following steps:

- Implement a loop through the different conditions that are run through in the experiment (e.g. varying the “Simon” input)
- Determine the reaction time by detecting the moment when the field first goes above zero (or above some threshold).
- Plot the field at different points of the simulation
- Plot the reaction time as a function of the different conditions