Usage for simplecell.m

The Matlab function simplecell implements a one-dimensional loop version of a distance-dependent shunting network with an odd-symmetric difference-of-Gaussians kernel. The network is solved at equilibrium. This formulation comes from (Grossberg and Todorović, 1988). See the source paper or the other documentation in this package for details.

The function requires one argument and allows one optional argument. The parameter 'input' is a row vector containing input levels for the nodes in the network. These levels must be non-negative. The size of the output will match the dimensions of this input exactly.

The optional parameter 'parameters' is a three-element row vector containing values for the network parameters 'C', 'E', 'u', 'v', and 'S'. 'C' must equal 'E' and 'u' must equal 'v', so only one value is necessary for each of these two pairs. The packing for the row vector is [C u S].

The network parameters 'C' and 'E' specify the amplitude of the excitatory and inhibitory Gaussian curves. 'u' and 'v' specify the spread of the Gaussians. 'S' specifies the distance between the two curves, in nodes. The decay rate of the network is hard-coded to zero. Outputs will always fall in the range [-1,1].

simplecell(input)

When called without optional parameters, simplecell defaults to 'C' and 'E' values of one and 'u','v' values of 1/8^2. The kernel separation 'S' assumes a default value of five.

simplecell(input, parameters)

When called with both parameters, simplecell fetches values for 'C', 'u', and 'S' from the first, second, and third position in the parameter vector, respectively.

Reference

Grossberg and Todorović. Neural dynamics of 1-D and 2-D brightness perception: a unified model of classical and recent phenomena. Perception & psychophysics (1988) vol. 43 (3) pp. 241-77