

1096-VG-1921 **Zeynep Akcay*** (za25@njit.edu), Department of Mathematical Sciences, New Jersey Institute of Technology, University Heights, Newark, NJ 07102-1982, and **Amitabha Bose** and **Farzan Nadim**. *Effects of Synaptic Plasticity on Phase and Period Locking of a Network of Two Oscillatory Neurons*.

We study the effects of synaptic plasticity on the determination of firing period and relative phases in a network of two oscillatory neurons coupled with reciprocal inhibition. We combine the phase response curves of the neurons with the short-term synaptic plasticity properties of the synapses to define Poincaré maps for the activity of an oscillatory network. Fixed points of these maps correspond to the phase locked modes of the network. These maps allow us to analyze the dependence of the resulting network activity on the properties of network components. Using a combination of analysis and simulations, we show how various parameters of the model affect the existence and stability of phase-locked solutions. We find conditions on the synaptic plasticity profiles and the phase response curves of the neurons for the network to be able to maintain a constant firing period, while varying the phase of locking between the neurons or vice versa. A generalization to cobwebbing for two-dimensional maps is also discussed. (Received September 16, 2013)