Storage capacity and retrieval time of small-world neural networks HIRAKU OSHIMA, TAKASHI ODAGAKI, Department of Physics, Kyushu University — To understand the influence of structure on the function of neural networks, we study the storage capacity and the retrieval time of Hopfield-type neural networks for four network structures: regular, small world, random networks generated by the Watts-Strogatz (WS) model, and the same network as the neural network of the nematode Caenorhabditis elegans. Using computer simulations, we find that (1) as the randomness of network is increased, its storage capacity is enhanced; (2) the retrieval time of WS networks does not depend on the network structure, but the retrieval time of C. elegans's neural network is longer than that of WS networks; (3) the storage capacity of the C. elegans network is smaller than that of networks generated by the WS model, though the neural network of C. elegans is considered to be a small-world network. Reference : H. Oshima and T. Odagaki, Phys. Rev. E **76**, 036114 (2007).

Hiraku Oshima
Department of Physics, Kyushu University

Date submitted: 26 Dec 2007   Electronic form version 1.4