

# Learning control model of chemotaxis for C.Elegans nematode

Demin A. V.

A.P. Ershov Institute of informatics systems SB RAS, [alexandredemin@yandex.ru](mailto:alexandredemin@yandex.ru)

**Abstract.** The C. Elegans nematode is currently the only organism, for which the structure of its nervous system is fully known, and the connectome is obtained in the first approximation. However, we still have not understood the working principles of such a simple nervous system. In this paper, we propose a learning control system, which models the work of neural circuits controlling chemotaxis of the C.Elegans nematode. A model of learning logical neurons has been proposed to create learning neural control circuits. Using the 3D-simulator of the nematode, we have conducted a series of successful experiments in training the proposed model. The control system can stably learn an optimal chemotaxis strategy in 1000 cycles on the average. At the same time, we observe a considerable visual likeness between the behavior of the model and the behavior of a real nematode. The results of experiments have shown that the movement function and associated orientation mechanisms of a nematode can be obtained by way of learning only in interaction with the environment. Practically, the results show that the proposed model can be successfully used to control complex objects.