# Self-Organization of Network on Activities for Intelligent Behaviors

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The cell in a multi-cellular organism does not occupy the same position. Activities in an individual cell are systemized through activities by using a needed part of the gene that is the same replica. Activities of circumstances around the cell control the gene expression, because protein molecules are required according to the activity under the individual circumstance and those are produced by means of genes. The action of individual cell results in specialization and systematization simultaneously. The biochemical reactions form the trace that is available as a tool for the intelligent behavior. In a brain, the trace is organized through activities by using a needed part of traces [1]. Electric charge transfer circuits where existence of activity is represented by means of electrons are able to play the mechanism of self-organization [2].

A nerve system unconsciously unifies plural activities of neurons to organize the conscious behavior of top priority. The activity becomes intermittent, because the response is transferred quickly. A line of intermittent transfer elements functions as a shift register. A loop of intermittent transfer elements functions as a short-term memory. Concurrent plural activities in an autonomous distributed system are systemized tentatively by means of an intermittent impulsive reaction. The meaning of activity on neuron can be attributed to the real world.

By using the signal source of which low level is provided via smaller resistance, the decoder in which the pattern of connections corresponds to that of activities is formed. The connection is able to transfer electrons towards both directions, because an input circuit possesses some electric power and an output circuit is passive. Since the drain and the source in a floating gate MOSFET is exchangeable symmetry, it functions as a controllable and programmable bi-directional connection. The operating circuits for programmable connections on a look-up table are shown in Fig.1. The simulated circuit and the results of simulation are shown in Fig.2.

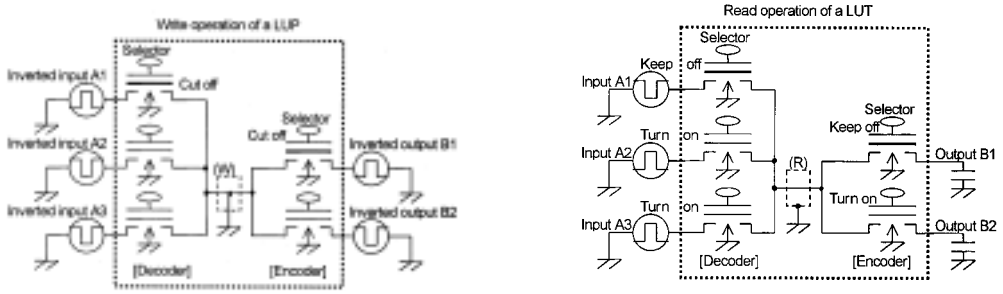


Fig.1.Operating circuits for FA(floating gate avalanche injection)MOS connections on a look-up table (LUT)

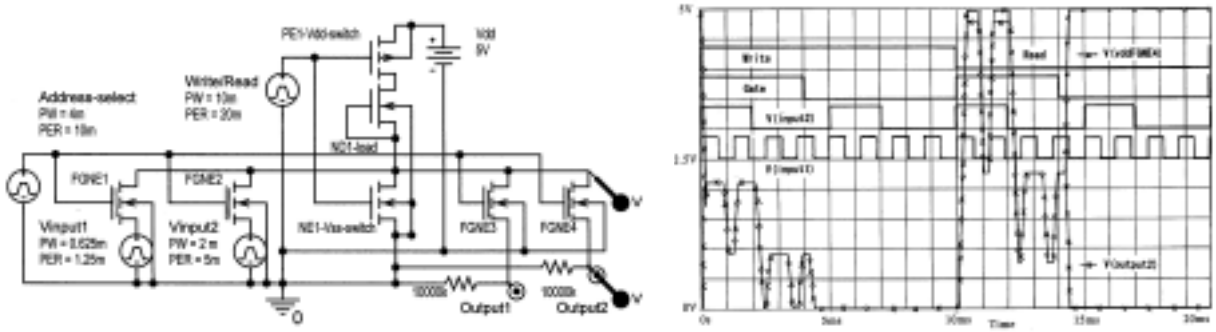


Fig.2. A FAMOS circuit for a programmable LUT and its responses obtained by using a simulator p-Spice

[1] S. Karasawa: *Activity transfer models for associative activities in a brain*, Proc. of the Language Sense on Computer, 8th PRICAI, pp.18-25, Auckland, New Zealand, August, 2004.
[2] S. Karasawa: *Dynamic MOS circuits for neuro-morphic hardware implementation based on the paradigm of activity*, Proc. of CCCT Vol.5, Austin, Texas, pp.194-199, August, 2004.