

Multipliers of Antiphase Solution in a System of Two Coupled Nonlinear Relaxation Oscillators

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A mathematical model of synaptic interaction between two neuron oscillators with delay in a connection chain is considered. The model is the system of non-linear differential-difference equations [1] with large parameter in right parts. Here an idea of fast threshold modulation is used.

For any natural n it is possible to choose the parameters such that the system has a periodic antiphase solution containing n asymptotically high bursts on the period. Simultaneously inphase solution with $2n$ bursts exist.

It is proved that the linearised on the antiphase solution system has unit multiplier, two multipliers which modules are close to 1, but less than 1, and all other multipliers are exponentially small. It means that antiphase solution is exponentially orbitally stable.

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References. [1] Glyzin S. D., Kolesov A. Y., Rozov N. K. On a method for mathematical modelling of chemical synapses, *Diff. Eq.*, 2013, 49:10, 1227–1244.