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Some mathematical aspects of the simulation of the motor circadian rhythm in crayfish

The motor circadian rhythm in crayfish shows experimentally two stages: a juvenil stage corresponding to a diurnal animal and non-synchronizable by external stimuli, and a mature stage which is nocturnal and synchronizable. Both stages are noisy and show a strong reaction to stimuli in terms of amplitude and level. We construct a mathematical model with two coupled nonlinear oscillators (based on a previous model for the ERG rhythm) which simulates the various aspects of the two stages. The mathematical model is based on a simulation of the Aschoff's law, and of its possible consequences under periodic stimuli.

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