Multiple time scale dynamics and geometry of a model for bipolar disorders

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Abstract

In this talk an ODE system modeling oscillatory patterns of mood alternations in manic-depression, also known as bipolar disorder, is analyzed. In suitably scaled variables the governing equations depend singularly on two small parameters ε and δ. We use concepts from geometric singular perturbation theory and geometric desingularization based on the blow-up method to understand the geometry of self-sustained oscillations providing a mechanism for the spontaneous, recurrent switching between mania and depression.