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Section:

9. Ordinary Differential Equations and Dynamical Systems

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Sobolev, Vladimir, Samara University, Russia

Canards and black swans

The paper is devoted to the study of relationship between integral manifolds of singularly perturbed ordinary differential equations and duck-trajectories. We derive sufficient conditions for the existence of continuous integral surfaces of central manifold type that are devided into stable and unstable parts and propose a method of construction of surfaces consisting of duck-trajectories. We use the standard approach to study the slow integral surfaces of variable stability (black swans). This surfaces are considered as natural generalization of the notion of a canard (French duck).
The model of combustion process of rarefied gas mixture in an inert porous medium is investigated and black swans are used for modelling of critical regimes in the problem of self-ignition