## Self-Organizing Control Systems for Unstable and Deterministic Chaotic Processes

**Authors :** Mamyrbek A. Beisenbi, Nurgul M. Kissikova, Saltanat E. Beisembina, Salamat T. Suleimenova, Samal A. Kaliyeva **Abstract :** The paper proposes a method for constructing a self-organizing control system for unstable and deterministic chaotic processes in the class of catastrophe "hyperbolic umbilic" for objects with m-inputs and n-outputs. The self-organizing control system is investigated by the universal gradient-velocity method of Lyapunov vector functions. The conditions for selforganization of the control system in the class of catastrophes "hyperbolic umbilic" are shown in the form of a system of algebraic inequalities that characterize the aperiodic robust stability in the stationary states of the system.

**Keywords :** gradient-velocity method of Lyapunov vector-functions, hyperbolic umbilic, self-organizing control system, stability **Conference Title :** ICMAR 2022 : International Conference on Manufacture, Automation and Robotics

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