

Identification of Dynamic Mathematical Models for Tumble Dryer on a Set of Operation States

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Abstract: An important step in building energy-efficient control systems is a formalization of the optimal control problem, identification of dynamic models for control object, taking into account possible changes in functional states. This article discusses problems of structural and parametric identification of dynamic mathematical models for tumble dryer, taking into account possible changes in status of the unit functioning in actual operation. A description of the drying apparatus as a control object and a diagram of its construction are presented. Also, technological constraints of the process are presented, state variables are introduced, and general description of the technological regime are given. After that, we make separation of the state space into a set of functional states, depending on the relative position of state variables. For each functional state, was carried out structural dynamics model identification for the object (by method of least squares) with criterion of minimum deviation between actual trajectories and values obtained with the model. After determining structures of dynamic mathematical models for the object, we held parametric identification, with criterion of minimum deviation between actual trajectories and values obtained with the model. At the end of the article, we presented in a tabular form the results of structural and parametric identification, as well as received values of maximum deviations between trajectories and models, and sample size used for identify.

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