HYBRID AUTOMATIC CONTROL SYSTEM OF THE CASCADE OF CENTRIFUGAL EXTRACTORS

Ekaterina P. Zelenetskaya[a], Aleksey G. Goryunov[a]

[a.] Tomsk, Tomsk Polytechnic University
e-mail: zeka@tpu.ru; alex1479@tpu.ru

The uranium chemical concentrate is being raw materials for uranium hexafluoride production. In spite of applying different extraction techniques it contains lots of impurities. In this case, using such products as a nuclear fuel is unacceptable, since impurities lead to reduction of products quality. The affinage of uranium concentrates used to achieve nuclear purity. Currently, affinage with extraction application is the most used method.

Due to usage high-reactivity components it is impossible to carry out experimental studies of the technological processes of extractions affinage. Therefore, it is necessary to carry out research in the purpose of optimization of monitoring and control processes of the extraction affinage on centrifugal extractors using the current experience in computer-aided modeling for developing of industrial process control system.

The investigation of industrial process control systems of a nuclear-fuel reprocessing as a controlled plant, have practically not been carrying out because of complexity and hazardous proceeding processes. The control of uranium chemical concentrates is by way of remote manual control. This leads to bad performance of process control, rising the negative influence of human-factor aspect and decline in efficiency. In connection with this, it is necessary to develop an automatic control system by this sort of plants. The cascade of centrifugal extractors have selected as a controlled plant, since processes proceeds are compatible. The foundation of mathematical models as to controlled plant, and control system is the ones outlined in the papers [1, 2].

Using hybrid control system is the way forward to solution of above mentioned problems. In consequence of various limitations in industries it was decided to make a hybrid control system which is based on neural-fuzzy control laws. That sort of systems using neural systems with automated teaching mode independently tune parameters up.

Current system allows to essentially reducing influence of human-factor aspect owing to significant robustness and stability as compared with classical automatic control systems on the basis of PID-control.

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