

ABSTRACT

**Adaptive Control Systems of the Technical Devices of
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Abstract

The paper considers possibilities of the new adaptive neural networks control method and systems (named the *autonomous adaptive control methodology (AAC)*) for the technical devices of the hydrocarbon production works. The AAC method allows to construct the adaptive control systems for objects that demand adaptation directly during the control process. Such objects have high degree of uncertainty at the beginning of the control process and/or can change their properties during their operation, i.e. the objects which are very hard to formalize mathematically. In a hydrocarbon production works there are many systems that can be regarded as such objects. Typically they are very complicated technically, are related with some natural phenomena, and/or their properties are nonlinear and can change during their operation. Traditional deterministic control systems for such objects usually turn out to be highly complex and expensive, and often their implementation is impossible. The implementation of the AAC methodology in this case allows to obtain a high quality control at a considerably lower cost level.

The AAC system represents an automatic self-developing recognition-control complex, that incorporates the solution of such problems as the automatic pattern classification and recognition, acquirement and classification of knowledge, the modeling of emotions, and decision making.

The paper considers following the AAC system application: the suppression of the resonance phenomena in a pipeline, the control over end-point reservoir filling process from several sources that differ in quality of oil, the stabilization of the energy supply system.