

THE USE OF SEVERAL FUZZY CONTROLLERS IN COGNITIVE INTELLIGENT CONTROL SYSTEMS

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The report discusses the optimal solution in the design of intelligent control systems - the formation of knowledge bases (KB) on a fuzzy controller for many control situations.

During the study, the operator's EEG signal was recorded while in a calm state and in a state of stress. Images and videos of various content were shown to the participants, the materials of each session corresponded to the supposed emotional state: neutral, positive and negative. A comparative analysis of the spectral power of various emotional states for the frontal, temporal, and occipital-parietal lobes of the cerebral cortex was carried out. Based on the assessment of the total tonic activity, as well as the values of the total spectral power of the frequency ranges, it is concluded that it is possible to assess the emotional background of a human operator.

The ICS robustness, obtained on the basis of such an approach, requires a minimum of initial information, both on the behavior of the control object, and on external disturbances.

Fuzzy controls allow to slightly expand the ability to recognize the emotional background by adding production logic rules. The combined use of an artificial neural network and soft computing optimizer on fuzzy controller allows to fully adapt the system, but it takes a long time to learn. For a system, such as intelligent robust control, time is a critical resource, especially in emergency and unforeseen situations. The percentage of successful classification of the emotional sign in a human operator when working with quantum neural networks is much higher than that of classical neural networks. This leads to an increase in the reliability of the system as a whole, and allows the formation of more robust knowledge bases.