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Assessment and Support of Critical Multilevel Infrastructure Security Using Information and Cognitive Technologies

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Abstract

Currently, the critical multilevel information infrastructure in cyberspace requires new tools to ensure stability in the face of cyber-attacks. This includes knowledge about the state of controlled objects, the operating environment, and the impacts of cyber threats and vulnerabilities. Advanced approaches are needed to support decision-making. The effectiveness of these decision support systems is directly linked to their ability to provide decision-makers with balanced and qualitative information that characterizes the current and projected states of critical infrastructure. This research proposes an approach to solving problems characterized by a high degree of uncertainty, complexity of strict formalization, and subjective nature, through the application of cognitive technologies. We have developed an information-logical model based on information and cognitive technologies for assessing and maintaining the security of the critical information infrastructure facility. The level of security was assessed using a Bayesian trust network, the structure of which was built using expert knowledge. © The Author(s), under exclusive license to Springer Nature Switzerland AG 2024.

Author keywords

Critical information infrastructure facility;   cyberspace;   decision maker;   information and cognitive technologies

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