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A Real Time Expert System for Decision Support in Nuclear Power Plants

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Abstract : In case of abnormal situations, the nuclear power plant (NPP) operators must follow written procedures to check the condition of the plant and to classify the type of emergency. In this paper, we proposed a Real Time Expert System in order to improve operator’s performance in case of transient or accident with reactor shutdown. The expert system’s knowledge is based on the sequence of events (SoE) of known accident and two emergency procedures of the Brazilian Pressurized Water Reactor (PWR) NPP and uses two kinds of knowledge representation: rule and logic trees. The results show that the system was able to classify the response of the automatic protection systems, as well as to evaluate the conditions of the plant, diagnosing the type of occurrence, recovery procedure to be followed, indicating the shutdown root cause, and classifying the emergency level.

Keywords : emergence procedure, expert system, operator support, PWR nuclear power plant
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