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## **High Efficiency Status Evaluation for Main Equipments based on Cyber Physical Systems in Distribution Network**

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### **Abstract**

The operation characteristics of various main equipments in distribution network are affected by both physical system events and cyber system events. In this paper, a status evaluation method for main equipment in distribution network based on Cyber Physical Systems is proposed, which can be utilized to quantitatively evaluate operation status of main equipment in distribution network, so as to analyze the operation situation of distribution network. Multi-status models of main equipment in distribution network are built to distinguish their characteristics under five operating statuses. In order to avoid the cumulative errors in the switching processes of multi-status models, parameter inheritance relationship among multi-status models is analyzed. In order to implement equipment status evaluation with the consideration of multiple scenarios and events, an event-driven simulation engine is designed. The simulation engine is capable to automatically switch simulation models when different events occur by analyzing operation data from various sources in Cyber Physical Systems. Event-driven simulation experiments on IEEE 33-bus and multiple actual 10-kV distribution networks validate the proposed status evaluation method.