

## **Abstract**

This paper considers a redundancy allocation problem for a multi-state power system. This type of problems involves selection of components with multiple choices and redundancy levels that produce maximum benefits, subject to the system availability and demand constraints. The presented multi agent ant system finds the optimal system topology by choosing system elements from a list of available equipments. Each element is characterized by its productivity, availability and cost. The objective is to minimize the total investment costs while satisfying both system availability and demand constraints. The procedure based on the generalized Ushakov's technique is used for evaluation of the system availability. Illustrative examples demonstrate how to obtain the optimal structures of the power system for different system availability constraints