Abstract
Artificial Intelligence applications in large-scale industry, such as thermal power plants, require the ability to manage uncertainty because current applications are large, complex and influenced by unexpected events and their evolution in time. This paper shows some of the efforts developed at the Instituto de Investigaciones Eléctricas (IIE) to assist operators of thermal power plants in the diagnosis and planning tasks using probabilistic intelligent systems. A diagnosis system, a planning system and a decision support system are presented. The diagnosis system is based on qualitative probabilistic networks, and the decision support system uses influence diagrams. The planning system is based on the Markov Decision Processes formalism. These approaches were validated in different power plant applications. Current results have shown that the use of probabilistic techniques can play an important role in the design of intelligent support systems for thermal power plants.

Keywords
Power plants, diagnosis, probabilistic reasoning, Bayesian networks, influence diagrams, Markov decision processes.