

学术报告会

时间：2013年10月29日(周二)10:00-11:30

地点：电院群楼2-410会议室

Fuzzy Fault Diagnosis with Automata Generated Languages

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Abstract:

A SDG-based simulation procedure is proposed in this study to qualitatively predict the effects of one or more fault propagating in a given process system. These predicted state evolution behaviors are characterized with an automaton model. By selecting a set of on-line sensors, the corresponding diagnoser can be constructed and the diagnosability of every fault origin can be determined accordingly by inspection. Furthermore, it is also possible to define a formal diagnostic language on the basis of this diagnoser. Every string (word) in the language is then encoded into an IF-THEN rule and, consequently, a comprehensive fuzzy inference system can be synthesized for on-line diagnosis. The language generation steps are illustrated with a series of simple examples in this paper. The feasibility and effectiveness of this approach has been tested in extensive numerical simulation studies.

Biography:

Chuei-Tin Chang received his B.S. degree in Chemical Engineering from Taiwan University, and Ph.D. degree in Chemical Engineering from Columbia University, New York City, U.S.A., in 1976 and 1982, respectively. He worked as a process engineer in FMC Corporation (Princeton, New Jersey, USA) from 1982 to 1985, and also as an assistant professor at the Department of Chemical Engineering in University of Nebraska (Lincoln, Nebraska, USA) from 1985 – 1989. He later joined the faculty of Chemical Engineering Department of Cheng Kung University (Taiwan) in 1989, became a full professor in 1993, and recently received the Distinguished Professor Award (2008 - 2011). He is a member of AIChE and TwIChE. His current research interests are mainly concerned with Process Systems Engineering (PSE), which include Process Integration, Process Safety Assessment and Fault Diagnosis, etc.