

Fault Prognostic and Prediction Based on the Importance Degree of Test Point

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Abstract : Prognostics and Health Management (PHM) is a technology to monitor the equipment status and predict impending faults. It is used to predict the potential fault and provide fault information and track trends of system degradation by capturing characteristics signals. So how to detect characteristics signals is very important. The select of test point plays a very important role in detecting characteristics signal. Traditionally, we use dependency model to select the test point containing the most detecting information. But, facing the large complicated system, the dependency model is not built so easily sometimes and the greater trouble is how to calculate the matrix. Rely on this premise, the paper provide a highly effective method to select test point without dependency model. Because signal flow model is a diagnosis model based on failure mode, which focuses on system's failure mode and the dependency relationship between the test points and faults. In the signal flow model, a fault information can flow from the beginning to the end. According to the signal flow model, we can find out location and structure information of every test point and module. We break the signal flow model up into serial and parallel parts to obtain the final relationship function between the system's testability or prediction metrics and test points. Further, through the partial derivatives operation, we can obtain every test point's importance degree in determining the testability metrics, such as undetected rate, false alarm rate, untrusted rate. This contributes to installing the test point according to the real requirement and also provides a solid foundation for the Prognostics and Health Management. According to the real effect of the practical engineering application, the method is very efficient.

Keywords : false alarm rate, importance degree, signal flow model, undetected rate, untrusted rate

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