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Object Oriented Fault Tree Analysis Methodology

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Abstract : Traditional safety, risk and reliability analysis approaches are problem-oriented, which make it great workload when analyzing complicated and huge system, besides, too much repetitive work would to do if the analyzed system composed by many similar components. It is pressing need an object and function oriented approach to maintain high consistency with problem domain. A new approach is proposed to overcome these shortcomings of traditional approaches, the concepts: class, abstract, inheritance, polymorphism and encapsulation are introduced into FTA and establish the professional class library that the abstractions of physical objects in real word, four areas relevant information also be proposed as the establish help guide. The interaction between classes is completed by the inside or external methods that mapping the attributes to base events through fully search the knowledge base, which forms good encapsulation. The object oriented fault tree analysis system that analyze and evaluate the system safety and reliability according to the original appearance of the problem is set up, where could mapped directly from the class and object to the problem domain of the fault tree analysis. All the system failure situations can be analyzed through this bottom-up fault tree construction approach. Under this approach architecture, FTA approach is developed, which avoids the human influence of the analyst on analysis results. It reveals the inherent safety problems of analyzed system itself and provides a new way of thinking and development for safety analysis. So that object oriented technology in the field of safety applications and development, safety theory is conducive to innovation.

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