World Academy of Science, Engineering and Technology
International Journal of Aerospace and Mechanical Engineering
Vol:13, No:05, 2019

Utilization of an Object Oriented Tool to Perform Model-Based Safety Analysis According to Extended Failure System Models

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Abstract : Model-Based Safety Analysis (MBSA) is an approach in which the system and safety engineers share a common system model created using a model-based development process. The model can also be extended by the failure modes of the system components. There are two famous approaches for the addition of fault behaviors to system models. The first one is to enclose the failure into the system design directly. The second approach is to develop a fault model separately from the system model, thus combining both independent models for safety analysis. This paper introduces a hybrid approach of MBSA. The approach tries to use informal abstracted models to investigate failure behaviors. The approach will combine various concepts such as directed graph traversal, event lists and Constraint Satisfaction Problems (CSP). The approach is implemented using an Object Oriented programming language. The components are abstracted to its failure logic and relationships of connected components. The implemented approach is tested on various flight control systems, including electrical and multi-domain examples. The various tests are analyzed, and a comparison to different approaches is represented.

Keywords : flight control systems, model based safety analysis, safety assessment analysis, system modelling
Conference Title : ICADOT 2019 : International Conference on Aerospace Design and Optimization Technologies
Conference Location : Amsterdam, Netherlands
Conference Dates : May 14-15, 2019