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Design for reliability of mechatronic systems supported by knowledge-based systems in design process early phases

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Mechatronic devices integrated with control systems are fundamental to safe operational condition of complex vehicles, especially aircrafts. In order to ensure reliability of aircraft mechatronic systems, with consequent improvement in safety, it is necessary to pay special attention to failures in these devices and their consequences in other sub-systems from the early design phases. An important element to consider is the electromagnetic compatibility, which deals with electrical and magnetic relations among components or between sub-systems operating in the same electromagnetic environment that may produce interference and malfunction. This paper presents a literature review on fault analysis in mechatronic and electronic control systems caused by electromagnetic problems, followed by the description of a Knowledge-Based System (KBS) prototype for the early design phases focused on electromagnetic compatibility and reliability of mechatronic systems. The prototype includes a knowledge base on mechatronic design. Rules, object-oriented modeling and semantic networks are implemented as knowledge representation techniques. Results are evaluated and discussed by experts in mechatronics and design. The paper also discusses issues on expandability and validation of KBS prototype.

Biography

Jonny Carlos da Silva has completed his DE and is a Professor at UFSC, Brazil. He has worked as Post-Doc Researcher at NASA Ames Research Center. He has more than 50 papers on design and knowledge-based systems. He is the Co-Author of a book on integrated product design. He is also a Master Coach and Speaker.

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