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Development of Measures to Assess Product Modularity and Reconfigurability

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Biblioscholar Okt 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x12 mm. This item is printed on demand - Print on Demand Neuware - This dissertation outlines a method and measures for assessing product modularity in terms of coupling, reusability, and flexibility. A five-step analysis process is developed and used to guide the modularity assessment. Defining and decomposing products are performed first. Using the resultant functional model from the first step, the identified functions are mapped to modules in a product in the second step. In the third and fourth steps, module-to-module interfaces are identified and captured in design structure matrices or a tensor plot. Finally, using results from steps 1-4, the Vector Modularity Measure that includes a reconfigurability measure can be calculated. The measures and analysis process are demonstrated using two precision guided munitions in the United States Air Force inventory. After this demonstration, the research focuses on extending the approach to a modular satellite design problem, namely AFRL's Plug-and-Play Satellite (PnPSat) concept for Operationally Responsive Space. Using the resulting analysis, recommendations to the existing PnPSat design to further increase modularity and its derived benefits are given. Lastly, the modularity analysis process and applications are used to draw conclusions and make...



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