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Using Axiomatic Design for Developing a Framework of Manufacturing Cloud Service Composition in the Equilibrium State

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Abstract : One important paradigm of industry 4.0 is Cloud Manufacturing (CM). In CM everything is considered as a service, therefore, the CM platform should consider all service provider's capabilities and tries to integrate services in an equilibrium state. This research develops a framework for implementing manufacturing cloud service composition in the equilibrium state. The developed framework using well-known tools called axiomatic design (AD) and game theory. The research has investigated the factors for forming equilibrium for measures of the manufacturing cloud service composition. Functional requirements (FRs) represent the measures of manufacturing cloud service composition in the equilibrium state. These FRs satisfied by related Design Parameters (DPs). The FRs and DPs are defined by considering the game theory, QoS, consumer needs, parallel and cooperative services. Ultimately, four FRs and DPs represent the framework. To insure the validity of the framework, the authors have used the first AD’s independent axiom.
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