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Abstract:

Model Validation Levels for the T&E Continuum: Concepts and a Case Study

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The Scientific Test and Analysis Techniques Center of Excellence (STAT COE) has been developing a repeatable, automatable methodology for validating the behaviors of models and simulations (M&S) in a digital engineering environment, called Model Validation Levels (MVLs). MVLs provide a general framework to validate M&S against structured data from a broad range of authoritative referents. The generality of MVLs enables their application throughout the capability lifecycle. MVLs support development of models, simulations, and digital twins. They also serve as a basis to establish models as authoritative representations of the behavior of the system(s) being modeled, which bridges technology maturation and engineering design. Furthermore, MVLs support the establishment, growth, and maintenance of a model-based authoritative source of truth for engineering and manufacturing design, as well as identify areas for model and system improvement in production, deployment, and operations. MVLs provide an absolute scale for model authority so that the authority of models may be understood in the context for which they were originally developed and for when they are reused for the definition of new operational concepts in response to emerging needs.