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Automated Geometric Shape Deviation Modeling Algorithms and Computer Applications for Additive Manufacturing Systems

A new model building algorithm and application enables automated and efficient deviation modeling in additive manufacturing systems, leading to fast, flexible, and high-quality production.

A significant challenge in dimensional accuracy control of an additive manufacturing (AM) system is the comprehensive specification of geometric shape deviation models for different computer-aided design (CAD) inputs on its constituent AM processes. Current deviation model building methods cannot satisfactorily address this challenge in practice because they are unable to leverage previously specified deviation models for different shapes and processes in an automated or rapid manner.

Researchers at Purdue University and the University of Southern California have developed a new model building algorithm and computer application that directly address the above challenge of AM systems. This new algorithm and application enables automated and computationally efficient deviation modeling of different shapes and/or AM processes without sacrificing predictive accuracy, compared to existing modeling algorithms. This algorithm and application for automated and comprehensive deviation modeling can ultimately be applied to advance fast, flexible, and high-quality manufacturing in an AM system.

Advantages:

-Efficient deviation modeling

-Predictive accuracy

-Flexible, high quality manufacturing

Potential Applications:

Technology ID
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Category
Robotics & Automation/Simulation, Digital Twins, & Industrial Automation
Robotics & Automation/3D Perception & Modeling for Automation

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-Computer-aided design

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