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A digital twin framework for the simulation and optimization of production systems

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Abstract

Industry 4.0 has raised the expectations on productivity, automation and resource efficiency of manufacturing systems. This paper proposes a digital twin framework for the simulation and optimization of production lines and cells that can be used in the design and operation stages. The framework is supported by an architecture that connects manufacturing and machine tool data (digital shadow), the discrete event simulation model and the optimization engine, allowing for a variety of functionalities to plan and manage the production system. A use case is provided to demonstrate this framework, implemented in an automated line for the manufacturing of railway axles.

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