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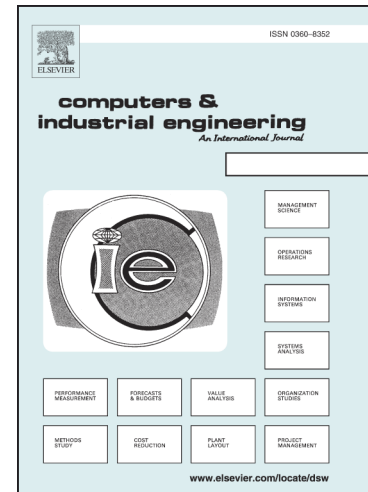
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Production scheduling and nesting in Additive Manufacturing

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Abstract

Additive manufacturing AM - 3D printing - is evolving and is currently experiencing its phase of industrialization. Applications are multiple and some are starting to have a real impact on the supply chain. With the use of layer-by-layer additive construction manner, AM changed the way of designing and manufacturing parts. AM technologies are planned to be the core of the next generation of production systems. Still, only few planning and scheduling approaches are proposed in the literature in order to operate AM systems efficiently.

In this work, the planning, nesting and scheduling problem in additive manufacturing is introduced. The aim is to satisfy the orders received from different distributed customers by due dates. The rising interest comes as AM's reaching a threshold level of maturity and the existing production planning and scheduling approaches have to be adapted and further developed in order to meet the technical and the organizational requirements of the additive manufacturing technologies. The mathematical formulation of the problem is presented, and a heuristic approach is proposed and developed in Python in order to solve it. The proposed heuristic solution is explained step by step, and illustrated using a numerical example. Experimental tests using the proposed heuristic are carried out, underlining the importance of planning/scheduling for an optimized production with AM.

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