

Intelligent Algorithm-Based Tool-Path Planning and Optimization for Additive Manufacturing

Authors : Efrain Rodriguez, Sergio Pertuz, Cristhian Riano

Abstract : Tool-path generation is an essential step in the FFF (Fused Filament Fabrication)-based Additive Manufacturing (AM) process planning. In the manufacture of a mechanical part by using additive processes, high resource consumption and prolonged production times are inherent drawbacks of these processes mainly due to non-optimized tool-path generation. In this work, we propose a heuristic-search intelligent algorithm-based approach for optimized tool-path generation for FFF-based AM. The main benefit of this approach is a significant reduction of travels without material deposition when the AM machine performs moves without any extrusion. The optimization method used reduces the number of travels without extrusion in comparison with commercial software as Slic3r or Cura Engine, which means a reduction of production time.

Keywords : additive manufacturing, tool-path optimization, fused filament fabrication, process planning

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