



Journal of Manufacturing Processes

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Reviewer Invitation for SMEJMP-D-21-00201

1 message

Guillaume FROMENTIN <em@editorialmanager.com>
Reply-To: Guillaume FROMENTIN <guillaume.fromentin@ensam.eu>
To: hendriko hendriko <hendriko@pcr.ac.id>

Wed, Feb 3, 2021 at 1:49 PM

Ms. Ref. No.: SMEJMP-D-21-00201

Title: High efficiency calculation of cutter-workpiece engagement in five-axis milling using distance fields and envelope theory
Journal of Manufacturing Processes

Dear hendriko hendriko,

Given your expertise in this area, I would appreciate your comments on the above paper. I have included the abstract of the manuscript below to provide you with an overview.

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Yours sincerely,

Guillaume FROMENTIN, Ph. D.
Associate Editor
Journal of Manufacturing Processes

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ABSTRACT:

Cutter-workpiece engagement (CWE) is fundamental to the process mechanics and dynamics modeling. Due to the variation of the feed directions in five-axis milling of free form surfaces, the instantaneous CWE is complex and time-varying. Therefore, for the industrial part milling process which contains tremendous cutter locations, how to calculate the CWE efficiently and accurately remains a challenge. In this paper, a high efficiency method for CWE calculation in five-axis milling based on the distance field and envelope theory is proposed. In the geometry modeling and milling simulation, workpiece surfaces are modeled using sampled distance fields stored in a well-designed octree data structure for efficient memory usage. The inverted trajectory method is used to calculate the tool swept volume, which is subtracted from the in-process workpiece by performing three-stage intersection detection and accelerated Boolean operation. As for the CWE extraction at a specific cutter location, the feasible contact arcs derived from the cutter surfaces based on the envelope theory are used as geometry primitives to intersect the in-process workpiece. A new segment-evaluation algorithm is offered to find the intersection points of each feasible contact arc with the workpiece surfaces. Finally, the CWE diagram is obtained by combining the entry and exit immersion angles of the engagement arcs at each axis height. The feasibility of the proposed method for industrial applications is evidenced by two case studies conducted on a developed virtual machining simulator. The results of the comparison with the B-rep based method indicate that the proposed method is more efficient while providing good accuracy.

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1 message

Guillaume FROMENTIN <em@editorialmanager.com>
Reply-To: Guillaume FROMENTIN <guillaume.fromentin@ensam.eu>
To: hendriko hendriko <hendriko@pcr.ac.id>

Wed, Feb 3, 2021 at 4:47 PM

Ms. Ref. No.: SMEJMP-D-21-00201
Title: High efficiency calculation of cutter-workpiece engagement in five-axis milling using distance fields and envelope theory
Journal of Manufacturing Processes

Dear hendriko hendriko,

Thank you for agreeing to review manuscript number SMEJMP-D-21-00201 for Journal of Manufacturing Processes.

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Guillaume FROMENTIN, Ph. D.
Associate Editor
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1 message

Guillaume FROMENTIN <em@editorialmanager.com>
Reply-To: Guillaume FROMENTIN <guillaume.fromentin@ensam.eu>
To: hendriko hendriko <hendriko@pcr.ac.id>

Sat, May 22, 2021 at 1:09 PM

Ms. Ref. No.: SMEJMP-D-21-00201R1
Title: High efficiency calculation of cutter-workpiece engagement in five-axis milling using distance fields and envelope theory
Journal of Manufacturing Processes

Dear Dr hendriko hendriko,

Thank you for taking the time to review the above-referenced manuscript. You can access your comments and the decision letter when it becomes available.

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Yours sincerely,

Guillaume FROMENTIN, Ph. D.
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