北京交通大学

硕士学位论文

基于切削力分析的叶片加工刀具轨迹规划

The Path Planning of Blade Machining Tool Based on Cutting Force Analysis.

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基于切削力分析的叶片加工刀具轨迹规划

The Path Planning of Blade Machining Tool Based on Cutting Force Analysis.

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致谢

　　放置在摘要页前，对象包括：1）国家科学基金，资助研究工作的奖学金基金，合同单位，资助或支持的企业、组织或个人。2）协助完成研究工作和提供便利条件的组织或个人。3）在研究工作中提出建议和提供帮助的人。4）给予转载和引用权的资料、图片、文献、研究思想和设想的所有者。5）其他应感谢的组织和个人。

摘要

[鼠标左键单击选择该段落，输入替换之。内容为小四号宋体。] 中文摘要应将学位论文的内容要点简短明了地表达出来，硕士学位论文一般为 500 1000 字，博士学位论文一般为 1000 2000 字。留学生英文版学位论文不少于 3000 字中文摘要，留学生英文版博士学位论文不少于 5000 字中文摘要。字体为宋体小四号。内容应包括工作目的、研究方法、成果和结论。要突出本论文的创新点，语言力求精炼。为了便于文献检索，应在本页下方另起一行注明论文的关键词（3-8 个），如有可能，尽量采用《汉语主题词表》等词表提供的规范词。图 X 幅，表 X 个，参考文献 X 篇。

关键词：你好；世界

ABSTRACT

English Abstract.

KEYWORDS: Hello; World

目录

1 引言

这里是引言[1,4]。

2 研究背景

这里是研究背景。

参考文献

[1] Matsumura T, Tamura S. Cutting Force Model in Milling with Cutter Runout [J]. Procedia CIRP, 2017, 58: 566 – 571. 16th CIRP Conference on Modelling of Machining Operations (16th CIRP CMMO).

[2] Feng H-Y, Menq C-H. The prediction of cutting forces in the ball-end milling process—I. Model formulation and model building procedure [J]. International Journal of Machine Tools and Manufacture, 1994, 34 (5): 697 – 710.

[3] Ning L, Veldhuis S C. Mechanistic Modeling of Ball End Milling Including Tool Wear [J]. Journal of Manufacturing Processes, 2006, 8 (1): 21 – 28.

[4] Bhattacharyya A, Schueller J K, Mann B P, et al. A closed form mechanistic cutting force model for helical peripheral milling of ductile metallic alloys [J]. International Journal of Machine Tools and Manufacture, 2010, 50 (6): 538 – 551.

[5] Rubeo M A, Schmitz T L. Milling Force Modeling: A Comparison of Two Approaches [J]. Procedia Manufacturing, 2016, 5: 90 – 105. 44th North American Manufacturing Research Conference, NAMRC 44, June 27-July 1, 2016, Blacksburg, Virginia, United States.

[6] Huang T, Whitehouse D. Cutting force formulation of taper end-mills using differential geometry [J]. Precision Engineering, 1999, 23 (3): 196 – 203.

[7] Melkote S N, Grzesik W, Outeiro J, et al. Advances in material and friction data for modelling of metal machining [J]. CIRP Annals, 2017, 66 (2): 731 – 754.

[8] Song Q, Liu Z, Wan Y, et al. Application of Sherman–Morrison–Woodbury formulas in instantaneous dynamic of peripheral milling for thin-walled component [J]. International Journal of Mechanical Sciences, 2015, 96-97: 79 – 90.

[9] van Luttervelt C, Childs T, Jawahir I, et al. Present Situation and Future Trends in Modelling of Machining Operations Progress Report of the CIRP Working Group 'Modelling of Machining Operations' [J]. CIRP Annals, 1998, 47 (2): 587 – 626.

[10] Forestier F, Gagnol V, Ray P, et al. Model-based operating recommendations for high-speed spindles equipped with a self-vibratory drilling head [J]. Mechanism and Machine Theory, 2011, 46 (11): 1610 – 1622.

[11] Abhang L, Hameedullah M. Simultaneous Optimization of Multiple Quality Characteristics In Turning EN-31Steel [J]. Materials Today: Proceedings, 2015, 2 (4): 2640 – 2647. 4th International Conference on Materials Processing and Characterzation.

[12] Lim E M, Menq C-H. Integrated planning for precision machining of complex surfaces. Part 1: Cutting-path and feedrate optimization [J]. International Journal of Machine Tools and Manufacture, 1997, 37 (1): 61 – 75.

[13] Papavinasam S. Chapter 10 - Modeling –External Corrosion [M] // Papavinasam S.

Corrosion Control in the Oil and Gas Industry. Boston: Gulf Professional Publishing, 2014: 2014: 621 – 714.

[14] Andreaus U, Baragatti P, Placidi L. Experimental and numerical investigations of the responses of a cantilever beam possibly contacting a deformable and dissipative obstacle under harmonic excitation [J]. International Journal of Non-Linear Mechanics, 2016, 80: 96 – 106. Dynamics, Stability, and Control of Flexible Structures.

[15] Alobaid F, Mertens N, Starkloff R, et al. Progress in dynamic simulation of thermal power plants [J]. Progress in Energy and Combustion Science, 2017, 59: 79 – 162.

[16] Haider J, Hashmi M. 8.02 - Health and Environmental Impacts in Metal Machining Processes [M] // Hashmi S, Batalha G F, Tyne C J V, et al. Comprehensive Materials Processing. Oxford: Elsevier, 2014: 2014: 7 – 33. Current as of 28 October 2015.

[17] Bargmann S, Klusemann B, Markmann J, et al. Generation of 3D representative volume elements for heterogeneous materials: a review [J]. Progress in Materials Science, 2018.

[18] Behera A K, de Sousa R A, Ingarao G, et al. Single point incremental forming: An assessment of the progress and technology trends from 2005 to 2015 [J]. Journal of Manufacturing Processes, 2017, 27: 37 – 62.

[19] Benardos P, Vosniakos G-C. Predicting surface roughness in machining: a review [J]. International Journal of Machine Tools and Manufacture, 2003, 43 (8): 833 – 844.

[20] Byrne G, Dimitrov D, Monostori L, et al. Biologicalisation: Biological transformation in manufacturing [J]. CIRP Journal of Manufacturing Science and Technology, 2018.

[21] Hong M S, Ehmann K F. Generation of engineered surfaces by the surface-shaping system [J]. International Journal of Machine Tools and Manufacture, 1995, 35 (9): 1269 – 1290.

[22] Peukert W, Segets D, Pflug L, et al. Chapter One - Unified Design Strategies for Particulate Products [M] // Marin G B, Li J. Mesoscale Modeling in Chemical Engineering Part IVol.46. Academic Press, 2015: 2015: 1 – 81.

[23] Altan T, Lilly B, Yen Y, et al. Manufacturing of Dies and Molds [J]. CIRP Annals, 2001, 50 (2): 404 – 422.

[24] Psyk V, Risch D, Kinsey B, et al. Electromagnetic forming—A review [J]. Journal of Materials Processing Technology, 2011, 211 (5): 787 – 829. Special Issue: Impulse Forming.

[25] Zaeh M, Siedl D. A New Method for Simulation of Machining Performance by Integrating Finite Element and Multi-body Simulation for Machine Tools [J]. CIRP Annals, 2007, 56 (1): 383 – 386.