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EDITORIAL

Preface

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Numerical controlled (NC) machining refers to using computer-controlled machine tools to machine a physical part from a raw stock. An NC machining process is in general very complicated, involving a multitude of disciplines including materials, the spindle, tools, control, vibration and chattering, and geometric modeling and computation. Of these various disciplines, computational NC machining is focused primarily on the aspect of computational and mathematical modeling of NC machining. This is an evolving field and has been both deepening and broadening, though always clinging to the theme of computation and modeling. This special issue on computational NC machining is intended to popularize this important research field, which is especially pertinent amid the coming era of big data, artificial Intelligence, and intelligent manufacturing.

Except for one, all the 16 papers in this special issue are selected from the presentations at the 7th International Symposium of Computational Numerical Control Machining (CNCM 2018). This is an annual event dedicated to gathering people in the area of Computational NC Machining to share the state-of-art developments in this field and stimulate new ideas. This symposium was first initiated by Prof. Chen-Han LEE in May 2012, at the Huazhong University of Science and Technology in China, and subsequently held at the Nanjing University of Aeronautics and Astronautics (2013), the Beihang University (2014), the Hong Kong University of Science and Technology (2015), the Nanjing University of Aeronautics and Astronautics (2016), the Tsinghua University (Taiwan) (2017), and finally the Northwestern Polytechnical University in Xi'An China in June 2018. Specific to CNCM 2018, 45 presentations were given at the symposium, out of which 23 were selected and underwent a further rigorous review process and finally 15 were accepted for this special issue. The remaining one paper in the issue was selected from an extra pool of four submissions, again after a rigorous review. I would like to sincerely thank Prof. Andrew Nee for his gracious support of having this special issue on Journal of Advanced Manufacturing

Content wise, the 16 papers cover a broad spectrum of topics in Computational NC machining that include:

(i) The traditional subject of tool path generation on 2D (by Y. Li), trochoidal slotting (by Tang), and multi-axis surface machining (by Xu and by Luo);
(ii) Modeling, analysis, and compensation of vibration and chattering in turning process (by Sun, by Song, and by Wang);
(iii) Processing of in-process machining data and its applications (by Hu and by Chen);
(iv) Efficient modeling and computation of in-process workpiece (by Chang);
(v) Application of NC machining to manufacturing of gears (by Zhou);
(vi) Processing of geometric data for tool path generation (by Jiang);
(vii) Modeling and analysis of energy consumption in machining (by Shi);
(viii) Robotic NC machining (by Yan);
(ix) Modeling of geometric errors of machine tools and the corresponding tool path compensation (by Yin);
(x) Modeling and analysis of machined part (by Zhang).

The next Symposium, CNCM 2019, will be held in June 2019 in the beautiful coastal city Dalian, China, to be organized by Dalian University of Technology. We hope that this special issue would help spread the message and reach-out to global research communities.

Before concluding the preface, I like to take this opportunity to thank Prof. Dinghua Zhang and the organization committee of the Northwestern Polytechnical University for

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successfully organizing CNCM 2018. In addition, I want to thank all the reviewers of this special issue—without your time and effort spent in the review, there would not be this preface. Finally, I wish a success of CNCM 2019 and look forward to meeting colleagues from not only Asia but also other continents of the world.