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Tool wear improvement and machining parameter optimization in face-hobbing of bevel gears

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Trial and error experiments are the dominant approaches to select machining settings and also cutting system design in face-hobbing of bevel gears. These time consuming experimental tests impose undesired costs to industries. In the present paper, a method is proposed to predict tool wear along the cutting edge of the blades semi-analytically in face-hobbing and chose appropriate machining settings based on minimum machining time and allowable cutting force and tool wear. Cutting blades in face-hobbing are converted to many infinitesimal oblique elements along the cutting edge and the tool wear is predicted on all these small elements. The constructed optimization problem seeks a face-hobbing scenario with minimum plunge time which meets the cutting force or tool wear constraints. The proposed method is applied in two case studies successfully to show the capability of the approach.

Biography

Mohsen Habibi has been a Research Assistant at the Mechanical and Industrial Engineering department of the Concordia University since 2012. His main field of study is Intelligent Manufacturing, Computer Aided Design/Manufacturing (CAD/CAM) and Additive Manufacturing (AM). He has been accomplished many funded research projects with leading industries in Canada and USA such as Bombardier, Pratt & Whitney, Cimetrix Solutions and Gleason Co. He has published his research works in the most prestigious journals in the design and manufacturing field.

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