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Machine Tools for Precision Machining: Design, Control and Prospects

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Message from the Guest Editors

Dear Colleagues,

Precision machining has become essential to the manufacturing sector. It generally involves a high-velocity machining process that makes parts requiring tight tolerances, high complexities, or both. This can be achieved through advanced computerized machine tools with high repeatability and accuracy. As a basic tool for manufacturing critical parts, high-precision multi-axis CNC machines are becoming indispensable in precision machining by producing different cutting effects to meet strict machining needs. At present, due to the continuous emergence of various new materials and new processes, cumbersome manufacturing processes, and harsh processing conditions have put forward higher and higher performance requirements for machine tools. Therefore, precision machining requires the in-depth development of advanced theories and technologies, such as machine tool motion planning, error control and compensation, machining chatter prediction and suppression, cutter wear and chatter monitoring, bearing fault diagnosis, process parameter optimization, etc., to ensure that the required accuracy and stability are maintained in the face of evolving challenges.

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Message from the Editor-in-Chief

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