

The Design of New Cycloid Gear with Variable Cross Section and the Research of End Milling in Five-Axis Machine Tool

Lizhi Gu¹, Jianmin Xu¹, Shanming Luo²

¹College of Mechanical Engineering and Automation, Huaqiao University, Xiamen 361021. China. E-mail: gu-lizhi888@163.com, xujianmin1020@163.com

²School of Mechanical and Automotive Engineering, Xiamen University of Technology, Xiamen 361024. China. E-mail: smluo@xmut.edu.cn

In order to improve the transmission efficiency and the service life of ordinary cycloid gear, 5 kinds of new cycloid gears with variable cross section are developed based on the principles of traditional cycloid drive. These new cycloid gears include concave cycloid gear, drum cycloid gear, spherical cycloid gear, oblique cycloid gear and cone cycloid gear. The general mathematical equations of these new cycloid gears are obtained and the characteristics of these new cycloid gears in transmission applications are analyzed in detail. A new method on the end milling tooth profile surfaces of cycloid gear using ball end mill is proposed. 5 axis numerical control simulations of these cycloid gears are conducted and the tool paths of machining cycloid gear are obtained. 5 kinds of cycloid gear with variable section are machined on five-axis CNC machining center, which verifies the correctness of the NC program. The study will provide a new way of designing and machining cycloid gear.

Keywords: The new cycloidal gear with variable section, End milling, Numerical control simulation.

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