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## 盘形铣刀加工等基圆锥齿轮的原理及齿面求解

### Processing principle and tooth surface determination of equal base circle bevel gear using disc cutter

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中文关键词: [等基圆锥齿轮](#) [盘形铣刀](#) [加工原理](#) [齿面方程](#) [仿真加工](#)英文关键词: [equal base circle bevel gear](#) [disc cutter](#) [processing principle](#) [tooth surface equation](#) [simulation processing](#)

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中文摘要:

为了实现等基圆锥齿轮的高速、高效加工, 基于等基圆锥齿轮理论, 分析了盘形铣刀加工等基圆锥齿轮的可行性, 建立了盘形铣刀数学模型、盘形铣刀加工坐标系, 分析并确立了各坐标系间的转换关系. 通过刀具曲面与齿面在共轭接触点处啮合方程的建立及求解, 得到了盘形铣刀加工的等基圆齿面表达式. 对盘形铣刀加工理论下的等基圆锥齿轮齿面与理论等基圆齿面进行了分析比较, 进行了盘形铣刀的仿真加工. 结果表明: 通过盘形铣刀截形、盘形铣刀加工运动中的回转角度、倾斜角度及倾斜中心点的合理设计, 盘形铣刀加工而成的实际齿面与理论齿面的接近程度达到工程要求, 使用盘形铣刀可以加工等基圆锥齿轮.

英文摘要:

The equal base circle bevel gear was machined with a disc cutter. Based on the equal base circle bevel gear theory, its feasibility was analyzed, the mathematical model of the disc cutter was established; then the processing coordinate system of this special bevel gear was constructed based on disc cutter, while the mutual transformation of the cutting coordinate system was analyzed and obtained. The expression of tooth surface was obtained through solving the meshing equation of conjugate contact point when cutting this gear with a disk cutter. This new tooth surface was compared with a theoretical tooth surface based on finger cutter theory, and the machining and the theoretical tooth surface are simulated. The results show that: by reasonable design of the disc cutter section shape, the rotary angle in machining, the tilt angle and tilt center in machining, the actual tooth surface using disc cutter machining and the theoretical tooth surface are similar to the meet engineering requirements, and the equal base circle bevel gear can be processed using disc cutter.