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基于成组技术和标准模板的滚齿CNC自动编程

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CNC gear hobbing automatic programming based on group technology and standard template

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摘要 针对滚齿数控加工的自动编程问题,提出一种基于成组技术和标准模板的滚齿CNC自动编程方法。利用成组技术原理,根据齿轮的几何特征和工艺特征的相似性对齿轮工件进行分类,利用每类齿轮单元的滚削数学模型,在工艺决策知识库支撑下确定出滚齿加工的工艺参数;根据滚削数控代码结构的相似性,运用字面相似度算法建立滚齿加工参数化控制标准模块库,组建每类齿轮单元的NC参数化代码模板,并运用表达式驱动算法完成对代码模板的实例化,自动生成NC代码,实现了滚齿加工的模块化、参数化数控程序设计。开发了基于西门子840D数控系统的滚齿自动编程系统,在某型号滚齿机上的应用表明该方法的编程效率高、算法可靠性强。

关键词 : 滚齿, 数控系统, 自动编程, 成组技术, 标准模板

Abstract : To solve automatic programming problems in CNC hobbing,a gear-hobbing CNC automatic programming method was proposed based on group technology and standard template.According to the similarities of the geometric characteristics and process characteristics,the principle of group technology was used to classify the gear work-pieces.By using the hobbing mathematical model of each gear classification unit,the hobbing process parameters was confirmed with the support of process decision-making knowledge base.According to the similarities of hobbing NC code structure,the standard NC code template of each gear class was abstracted.The expressions method was used to instantiate the standard template,and NC code was generated automatically.The modular and parametric hobbing CNC programming were achieved.The hobbing automatic programming system based on Siemens 840D CNC system was developed and the application results showed that the CNC programming alogorithm was efficient and reliable.

Key words : gear-hobbing numerical control system automatic programming group technology standard template

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