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The Research of the Post processing of NC Automatic Programming

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Abstract: With the rapid development of economy, the industry competition faced by enterprises is also increasing. In order to improve the core competitiveness, apply NC automatic programming technology, shorten the product cycle and strengthen the solution of NC programming post-processing problems, NC technology and NC machine tools have an important industry position, which can realize the automatic and flexible development of mechanical manufacturing industry, This paper briefly describes the relevant theories of NC automatic programming, NC programming and CAD / CAM software programming. By selecting appropriate tools in NC machining, aligning machining parts and accurately positioning NC machine tools, the post-processing problems of NC programming of parts can be alleviated, the production efficiency of products can be improved and the economic benefits of enterprises can be increased, It is hoped that it can provide a theoretical reference for the post-processing research of NC automatic programming.

Keywords: NC automatic programming machining; Post treatment; UG-CAM

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1.Introduction

1.1 NC automatic programming software system

Theoretical research on UG-CAM NC automatic programming software system The NC programming system includes drawing graphics, making tracks, outputting processing codes and coordinating and integrating processes, such as establishing processing graphics, generating tool running tracks, and quickly generating NC codes after post-processing, so as to ensure the stable operation of the program, improve the processing quality of parts, optimize debugging and modify the program, and improve readability. There is no need for excessive programming for series parts, You can edit and modify dimension data. Reduce expenses and improve the professional level of programmers. NC automatic programming realizes the programming of machine tools through computer operation. The staff only need to input the size and shape of parts and tool path according to the format, and the NC automatic programming software in the computer can start to run. After compilation, calculation and processing, the part processing flow can be realized, such as determining the processing program and establishing the tool path diagram, Or output the NC machine program with the help of communication cable and interface. Using automatic programming can make complex space curved surface workpiece, reduce calculation errors, improve workpiece production efficiency and production quality, and shorten product production cycle.

1.2 Brief description of post-processing principle of NC automatic programming

In order to effectively process parts and manufacture tool paths, NC automatic programming generally carries out module processing with the help of UG, but the original tool path files cannot be processed directly by machine tools and need to be processed by computers. Because different types of machine tools have different control systems and physical structures, NC programs need to be optimized, Make its instruction and format meet the requirements of NC machine tools. Therefore, only the processed tool path data can better meet the requirements of different types of machine tools, that is, using computers to realize NC automatic program post-processing and optimize NC code, so that different machine tools can effectively identify tool path data (NC generation)

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Code). That is, the main function of digital control manufacturing software is to generate appropriate tool path. Due to different machine tool parameters and physical structure, the tool path data of CAM software does not meet the requirements and cannot directly process parts. It must be corrected to meet the specific requirements of different machine tools [1].

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2.Background

To carry out automatic programming, we need to pay attention to the clamping and CNC machine tool for aligning and machining parts and accurate tool setting and positioning alignment of parts and clarify the importance of clamping parts. In the process of advancing the clamping work, it is necessary to align the reference direction of the machined parts connected with the NC machine tool. Usually find a direction, such as the x-axis or y-axis direction. The method is to install the dial indicator on the spindle of the machine tool, and one side of the processing unit is above the contact finger of the indicator, such as a side in the x-axis direction. Therefore, you can check the movement of the hand wheel indicator pointer. If the swing range is within the error range, it means that the x-axis of the workpiece is basically the same as that of the machine tool. On the contrary, it is necessary to adjust the parts (please note that the placement direction should be consistent with the working coordinate direction of the machine tool) until the dial indicator swings within the allowable error range.

For the accurate tool setting and positioning of NC machine tools, the tool setting is the coincidence of the tool tip and the programming origin. For example, when machining the upper surface of the cube, if the center of the upper surface of the cube is taken as the origin in the modeling process, the edge contact method should be used to make the tip of the tool reach the cube of blank point. When setting the tool, you need to set a specific point, that is, the origin of the machine coordinate system; Raise the tool tip to the beginning of the program, such as xoy0230. Different control systems use different methods to set the origin of the machine coordinate system. Different systems must choose different processing methods, improve the setting of tool positioning, optimize the performance of NC machine tools and improve the production quality of parts. Research on post-processing of NC automatic programming transfer the processed NC program to the NC machine controller

3.Conclusion

Directly use the system software to communicate between PC and NC controller provided by NC machine tool manufacturer. If there is no special communication software, the internal communication software of CAM software can be used to transfer NC files as long as it passes through RS232 general interface. The method is as follows: select Edit mode (edit mode) on the controller. Press the key to select the handler page; Turn on the protection switch used for storage; Enter “O” and “program number”; Press the input key, then it will flash and display “in”; After entering the processing program, turn off the protection switch of the program.Effective input of tool offset: select MDI mode on the controller; Press the offset key to select the display surface of the tool offset data. Move the cursor to the position where you want to enter the offset number and enter the offset quantity; Press the input key to enter the offset displayed on the screen.Setting of transmission parameters: the transmission format is ASCII; The transmission speed is 4800; The data bit is 7; Stop dragon is 2; Parity check is e; Set the communication port according to the situation of the computer. For masteream software, the method is to select the main file menu, transfer the next page, and set the transmission parameters; If you choose to display on other screens, you can also observe the file transfer process. The format of NC files automatically generated by cam system must meet the machine control, and the specifications of the system can be processed automatically [2].

3.1 Selection of NC tools

To improve the efficiency of NC work, it is necessary to accurately select NC tools and realize the scientific and effective allocation of NC tool resources. It can not only avoid the waste of resources caused by idle single tools, but also reduce the use frequency of single tools, avoid reducing the accuracy of production and increase the restrictive effect of tools. Generally, the selection of tools is started under the condition of human-computer interaction of NC programming. The general principles of tool selection are: easy installation and adjustment, good rigidity, high durability and high precision. In the case of realizing the machining requirements, trying to choose a shorter tool handle can enhance the good rigidity of tool machining. When enterprises choose tools, the size used needs to be compatible with the surface size of the workpiece to be processed. End mills are usually used to process the outer contour of flat parts. When milling, cemented carbide inserts should be selected for milling. When machining the boss and groove of parts, high-speed steel end milling cutter should be selected for machining; When drilling rough surface or rough machining, cemented carbide blade can be selected for corn milling cutter; Ball end milling cutter and disc milling cutter are often used when dealing with solid surface and variable bevel contour shape. When machining a free-form surface, the cutting speed of the end of the spherical end tool is 0. In order to ensure the machining accuracy, a very close cutting line spacing is usually obtained. Therefore, the spherical end tool is usually used for finishing machining. In terms of surface treatment quality and cutting efficiency, the flat head tool is better than the spherical head tool, as long as it is guaranteed not to be cut, whether it is the rough Finishing and flat tools

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should be the first choice. In addition, the durability and accuracy of tools are closely related to the price of tools. Generally, the selected tools will increase the cost of tools, but the processing quality and efficiency of parts will be improved, which can also greatly reduce the overall processing cost [3].

3.2 Processing procedure analysis of NC automatic programming

The machining plan of NC automatic programming generally includes: machining program, machining steps and tool path. Due to the complexity and diversity of parts and different contour shapes, blanks and sizes, specific parts processing procedures should be formulated in the processing process. In order to achieve the goal of high quality, high efficiency and low consumption, work flexibility should be comprehensively considered and reasonable arrangement should be made. The overall arrangement principle of processing procedures should follow specific work requirements. From rough machining to finish machining, it takes a very short time to obtain higher quality parts. During cutting, rough and finish machining shall be reasonably arranged. On the premise of ensuring the machining quality, the durability of the tool and the rigidity of the machine tool workpiece tool system, make full use of the performance of the machine tool and the cutting performance of the tool, and use a large cutting depth for rough machining as little as possible. Before finishing, the number of processing conditions of each part should be as uniform as possible, that is, reduce the number of tools as much as possible and shorten the working time of rough machining. Finishing mainly ensures the machining accuracy and quality of parts. Therefore, the final contour of parts should be carried out continuously before final cutting. When the same tool is concentrated on the NC machine tool, in order to reduce the time used for tool change, you can use the tool to process the parts, place the same cutting parts on the workpiece surface, and use the same tool to process the parts as much as possible. In order to determine the roughing tool path, the shortest tool path can be selected, and selecting a larger cutting depth in roughing can effectively reduce the

Reduce the number of cuts and shorten the cutting time. Therefore, on the premise of ensuring the machining quality, the machining program has the shortest tool path, which can save the machining time and reduce the tool wear and consumption.

3.3 research on graphic input of NC automatic programming

The NC automatic programming system uses the graphic input method to select the menu on the screen. Through the graphic generation and editing function of the system, the geometric shape of the part is input on the computer to complete the part modeling, and the corresponding machining parameters are input to determine the machining type and method direction of the part. The tool path file is automatically generated through the software system, The tool motion dynamics and processing path are clearly displayed. The programming system has good interactivity, strong intuition and fast running speed. It is convenient to modify and check, and easy to master and use. The automatic programming system realizes the integration of model tool path generation and machining program automatic generation, and can deal with the geometric model of parts, the generation of tool path files and the generation of part processing programs.For the geometric model of parts, the automatic programming system usually establishes CAD design module, which can easily build the geometric model of parts. In addition, the automatic programming system also provides a standard graphic conversion interface to obtain the actual graphic format of the programming system, realize geometric model and improve the production quality of parts; The generation of tool path file needs to be carried out after the geometric model of the part is completed. The NC automatic programming system can generate the appropriate tool path according to the actual situation of the part. The basic process is generally: clarify the processing type of parts, select the processing position according to the characteristics of parts, select the cutting method for part process, and select the required part cutting parameters for more accurate part production, such as tool parameters. The programming system generally calculates based on the geometric model data and cutting data of parts, So as to generate accurate data of tool motion path, that is, tool position file, and display the path of actual machining motion of tool [4].

With the economic globalization, NC machine tool technology has been widely used in production practice. NC programming is the core issue that enterprises need to pay attention to in NC machining. If they want to complete NC programming, they need to carry out process processing. By referring to the practical operation of advanced technical principles at home and abroad, they can carry out process processing scientifically and reasonably to improve the quality and efficiency of parts processing. NC machining is programmable and can be used for flexible machining, but its equipment cost is high and energy consumption is large. It is generally used in the occasions of frequent product replacement and short production cycle. The program quality is related to the professional level and process implementation process of the staff. A good NC automatic program can effectively improve the processing

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quality of parts and give full play to the performance of NC machine tools, Promote the effective application of NC machining technology in the processing of more complex parts, so as to shorten the product production cycle, reduce the production cost of enterprises and improve the social and economic benefits.

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