

The framework of computer simulation for A five-Axis machine tool

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ABSTRACT

In recent years, many of medical equipment, aircraft parts, auto parts and molds need to be high-precision and space geometries are complicated. Thus, it makes the trend of using five-axis machining for high-precision demand. For the processing of parts with complicated curved surface, the five-axis machine can not only improve the machining efficiency, the surface accuracy of machining curved surface, and reduce the cost of design and manufacture of fixture, but also meet the market's demand for product reliability and short delivery period. Since the five-axis machines equipped five driven axes, accompanying with accumulation of errors due to the increased number of synchronous motion axes, the overall motion accuracy of five-axis machine tools are often significantly worse than that of conventional three-axis ones. Therefore, the error pattern, error measurement, and compensation of errors should be considered in the design of a five-axis machine. However, the analysis of the error source of a five-axis machine is more complex and difficult than that of a three-axis machine. This study aimed to simulate the process of drill guides in implant surgery to cut the cost down. A virtual desktop five-axis machine tool is built as an example to simulate the dental cast machining and the drilling guides in implant surgery.

Keywords : five-axis machine tool、geometric errors、virtual machining

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