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飞机结构件数控加工变形控制研究与仿真

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Researching and Simulating Deformation of Aircraft Structure Part in NC Machining

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摘要

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摘要 以飞机弧形结构件这一典型易变形的零件为例,研究数控加工变形情况及其影响因素,分析数控加工过程中切削力对变形、残余应力对加工变形、装夹布局对飞机结构件数控加工变形的影响,并针对所研究的3个方面建立相应的物理仿真模型,模拟加工变形情况,提出了相应的解决方案。

关键词: 数控加工 变形 模拟 残余应力 弧形件

Abstract: This paper takes the aircraft arc-shaped workpiece for the study on NC machining deformation and the reason which leads to machining deformation. Three aspects are discussed, which include analyzing cutting force's contribution to deformation in NC machining process, researching the distribution and influence of residual stresses which lead to workpiece deformation and researching the fixture layout which affects NC machining deformation of large structure part. These three aspects of actual machining process are considered all together. The computing physical simulation model is established to simulating and predicting machining deformation. Several methods which solve the problem of deformation are proposed.

Keywords: NC machining deformation simulation residual stress arc-shaped workpiece

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