航空学报 » 2004, Vol. 25 » Issue (3) :317-320 DOI:

金属切削加工的热力耦合模型及有限元模拟研究

黄志刚, 柯映林, 王立涛

浙江大学机械与能源工程学院 浙江杭州 310027

Coupled Thermo-mechanical Model for Metal Orthogonal Cutting Process and Finite Element Simulation

HUANG Zhi-gang, KE Ying-lin, Wang Li-tao

College of Mechanical & Energy Engineering, Zhejiang University, Hangzhou 310027, China

摘要 参考文献 相关文章

Download: PDF (249KB) HTML 0KB Export: BibTeX or EndNote (RIS) Supporting Info

摘要 基于切削加工的热-弹塑性有限元方程并在一定假设的条件下,建立了金属正交切削加工的热力耦合有限元模型。分析、研究了切屑分离标准、刀屑界面的摩擦模型以及热控制方程等切削加工模拟所涉及的关键技术,并提出了几何-应力切屑分离标准。最后,采用ABAQUS软件对材料40CrNiMoA进行了切削加工模拟,并分析、讨论了模拟结果。通过与试验数据比较,证明了所建立的有限元模型的正确性。

关键词： 切削加工 热力耦合 切屑分离标准 有限元模拟

Abstract： Based on thermo-elastic-plastic finite element equation for simulating the metal orthogonal cutting process, a coupled thermo-mechanical model with regard to plain strain orthogonal metal cutting is constructed under some assumptions. In addition, several special finite element techniques, such as the chip separation criteria and friction model, have been implemented to improve the accuracy and efficiency of the finite element simulation. A chip separation criterion based on stress failure is adopted to realize the separation of twin nodes. In the end, the machining process of material AISI4340 is simulated, and some results of simulation are analyzed and discussed. This coupled thermo-mechanical model is proved to be right by comparing the simulated results with the experimental data.

Keywords： cutting process coupled thermo-mechanical chip separation criterion finite element simulation

Received 2003-04-03; published 2004-06-25

Service

把本文推荐给朋友

加入我的书架

加入引用管理器

Email Alert

RSS

作者相关文章

黄志刚

柯映林

王立涛

引用本文:

黄志刚;柯映林;王立涛. 金属切削加工的热力耦合模型及有限元模拟研究[J]. 航空学报, 2004, 25(3): 317-320.

HUANG Zhi-gang;KE Ying-lin;Wang Li-tao. Coupled Thermo-mechanical Model for Metal Orthogonal Cutting Process and Finite Element Simulation[J]. Acta Aeronautica et Astronautica Sinica, 2004, 25(3): 317-320.