论文

三维RTM固化过程的数值模拟

(上海交通大学 塑性成形系, 上海 200030)

摘要：

通过对RTM工艺的分析，可知固化过程是复合材料成型一个非常重要的阶段。本文中运用控制体积法和差分法对固化过程进行了数值模拟，将来自放热化学反应的非线性热源项处理成节点集中载荷。以厚板构件为例，与已发表的实验数据进行了比较，结果表明本文方法的正确性，并在此基础上分析了固化工艺对材料性能的影响。

关键词： 三维RTM　固化过程　数值模拟　控制体积法　差分法

Numerical simulation of curing procedure of three-dimensional RTM

(Plasticity Forming Engineering Department, Shanghai Jiao Tong University, Shanghai 200030, China)

Abstract:

By analyzing the non-isothermal RTM process, it is well known that the curing process is the key moment during composite molding. Using control volume and difference scheme methods, the numerical simulation of curing procedure was gotten. In this paper, the internal heat generation caused by the exothermic cure reaction was treated as the nodal lumped load with the help of the control volume technique. The numerical example of a thick plank was compared with experiment data publicly published and good agreement was obtained. The results show that the present procedure is right. The analysis about the influence of the curing process on the material performance on the basis of the procedure is correct.

Keywords: three-dimension RTM　cure procedure　numerical simulation　control volume method difference scheme method

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