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有限元方法形成三维Michell桁架

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摘要: 提出了形成三维Michell桁架的有限元方法. 采用正交异性纤维增强复合材料模型模拟Michell桁架. 纤维在节点处的密度和方向作为基本设计变量. 根据有限元分析得到节点位置的应力和应变. 采用迭代方法, 将纤维方向调整到主应力方向; 根据纤维方向的应变改变纤维密度. 仅需少量迭代即可得到满足Michell准则的应变场和类桁架连续体. 最后根据节点处的纤维方向用连续线表示出Michell桁架. 几个算例表明了算法的有效性和计算效率.

关键词: 结构最优; 有限元方法; 拓扑优化; Michell桁架; 应力约束
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