

中文力学类核心期刊  
中国期刊方阵双效期刊  
美国《工程索引》(EI Compendex)核心期刊(2002—2012)  
中国高校优秀科技期刊

伍贤洪, 龚曙光, 曾兴国, 钟勇文. 积分背景网格对自适应EFG法拓扑优化的影响研究[J]. 计算力学学报, 2012, 29(5): 693-698

### 积分背景网格对自适应EFG法拓扑优化的影响研究

Study on effects of background integration mesh on topology optimization based on adaptive EFG method

投稿时间: 2011-07-11 最后修改时间: 2011-11-20

DOI: 10.7511/jslx20125009

中文关键词: [拓扑优化](#) [无网格Galerkin法](#) [自适应](#) [背景网格](#) [误差估计](#)

英文关键词: [topology optimization](#) [EFG method](#) [adaptive](#) [background mesh](#) [error estimator](#)

基金项目: 国家自然科学基金(50875223); 湖南省自然科学基金(09JJ9005)资助项目.

作者	单位	E-mail
<a href="#">伍贤洪</a>	<a href="#">湘潭大学 机械工程学院, 湘潭 411105</a>	
<a href="#">龚曙光</a>	<a href="#">湘潭大学 机械工程学院, 湘潭 411105</a>	<a href="mailto:gongsg@xtu.edu.cn">gongsg@xtu.edu.cn</a>
<a href="#">曾兴国</a>	<a href="#">湘潭大学 机械工程学院, 湘潭 411105</a>	
<a href="#">钟勇文</a>	<a href="#">湘潭大学 机械工程学院, 湘潭 411105</a>	

摘要点击次数: 440

全文下载次数: 236

中文摘要:

采用应力能量范数作为误差指标, 探讨了EFG法中积分背景网格对计算精度的影响, 得到了合理划分背景网格的建议; 建立了以节点密度为设计变量、以最小化柔度为优化目标优化模型。采用以节点密度值为加判据的自适应规则加判据方案, 开展了连续体结构的拓扑优化研究, 该加判据方案能有效地减少设计变量的个数, 探讨了背景网格对拓扑优化结果的计算结果表明, 采用合适的背景网格不仅能进一步减少设计变量的个数, 而且能够改善拓扑优化结果的光滑性, 使计算效率和精度得到提高。

英文摘要:

The effect of background integration mesh on calculating accuracy in element-free Galerkin method is discussed by using stress-energy norm as the error indicators. A suitable division of the background mesh is recommended. The topological optimization model is built by selecting nodal density as design variable and flexibility as objective function. While the density value of node is used as the criteria of adding node within a region, the scheme of adaptive regular inserting node is created, and continuous structural topology optimization is investigated. It can effectively reduce the number of design variables that the program of inserting node is used in the process of topology optimization. The effects of background integration mesh on topology optimization results are discussed. The numerical results obtained show that a suitable background cell can not only further reduce the number of design variables, but also can improve smoothness of the topology optimization results, and the computational efficiency and accuracy can be improved.

[查看全文](#) [查看/发表评论](#) [下载PDF阅读器](#)

关闭