

简报

## 求解非比例阻尼体系复模态的实模态摄动法

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收稿日期 2006-4-17 修回日期 2006-9-5 网络版发布日期 2007-3-5 接受日期

**摘要** 根据工程结构的实际情况,建立了非比例阻尼结构体系复模态特性的近似求解方法——实模态摄动法.这一方法以复Ritz向量展开原理为基础,把非比例阻尼结构体系复模态特性的分析过程分解为两个基本步骤,首先以结构体系的实模态向量构建复Ritz向量的求解子空间,然后通过非线性复代数方程组的求解代替扩阶后的复特征值方程的求解,从而简化了计算过程.通过两个算例表明:这一方法不仅计算简便,而且具有较高的计算精度和执行效率,对于复杂的非比例阻尼系统是很适用的,具有一定的工程应用价值.

**关键词** [非比例阻尼](#) [复模态](#) [模态摄动法](#) [复Ritz向量展开](#) [复杂结构](#)

**分类号** [0327](#)

## Modal perturbation method for obtaining complex modal characteristics of non-proportional damping systems

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### Abstract

An approximate approach based on the direct modal perturbation method is suggested for analyzing the complex modal characteristics of non-proportional damping structure systems. The proposed approach uses the expansion of complex Ritz vectors. The procedure is in two steps. First, the subspace of the solution based on the complex vectors is formed by using the conventional real modes of the structure. Then, a set of solutions of non-linear complex algebraic equations is established to displace the solution of the complex eigen-value equations. The results of two numerical examples show that the suggested method simplifies the solving procedure and is of high precision and efficiency. It can be used for the solution of the complex modal characteristics and dynamic responses of non-proportional damping structure systems.

**Key words** [non-proportionally damping](#) [complex modal characteristics](#) [modal perturbation method](#) [expansion of complex Ritz vectors](#) [complicated structure](#)

DOI:

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