



航空学报 » 2001, Vol. 22 » Issue (5) :411-414 DOI:

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带摩擦阻尼的叶片响应求解方法

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NEW METHOD TO RESOLVE VIBRATORY RESPONSE OF BLADES WITH FRICTION DAMPING

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摘要

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摘要 提出了一种可用于带摩擦阻尼的复杂结构的动力特性的计算方法——动柔度法。给出了计算公式及流程。并用此法对一带摩擦阻尼器的模型叶片进行了稳态响应的计算。通过理论计算并与实验对比表明,动柔度法是一种可用于复杂结构响应计算的高效的算法。由于叶片与阻尼器之间有复杂的运动关系,在用于带阻尼器的叶片的响应计算及阻尼器优化设计时,此法将更显优越

关键词: 阻尼 振动 干摩擦 叶片 柔度法 动力响应

Abstract: Turbine blades are often designed to include friction damping, such as shroud and platform damper, to alleviate vibration. A dynamic compliance method is introduced to resolve the response of complex structures, such as turbine blade, with dry friction damper. Based on the harmonic balance method, high order harmonic is included. Finite element method is used to obtain the compliance matrix. Formulae and flow chart are given. A model blade with the friction damper is calculated and laboratory test is also conducted to estimate its validity. The accuracy and efficiency of this method in solving the response of structures with friction dampers are verified.

Keywords: damping vibration dry friction blade dynamic compliance method response

Received 2000-08-31; published 2001-10-25

引用本文:

郝燕平;朱梓根. 带摩擦阻尼的叶片响应求解方法[J]. 航空学报, 2001, 22(5): 411-414.

HAO Yan-ping; ZHU Zi-gen. NEW METHOD TO RESOLVE VIBRATORY RESPONSE OF BLADES WITH FRICTION DAMPING[J]. Acta Aeronautica et Astronautica Sinica, 2001, 22(5): 411-414.

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