Advances in Aircraft Structures

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CONTENTS

Structural Instability

Structure Analytical Methods

Chapter 17
Structural Analysis of an Active Beam

J.S. Mohamed Ali, Md. Raisuddin Khan, Md.Tarique Bin Hamid

Abstract

An adaptive beam model of anisotropically actuated beam is formulated to determine the displacement and twist actuation capabilities of anisotropic piezoelectric actuators as related to the potential application for the helicopter blade control. The chosen beam has been modeled in ANSYS. Some existing results on piezoelectric actuators with different combinations and lay-ups were verified.

***Keywords**: Smart structures, piezoelectric, helicopter blades, active control*

1. Introduction

In recent decades researchers have been investigating the application of the active material system developments to the existing engineering systems in an effort to improve these systems. There is a drive toward systems with improved performance, less parts, lower maintenance costs, and higher reliability. This project focuses on the application of active materials technology to rotor blade control mechanism, especially in this case to control static displacement phenomenon.

The basic operating principle of a helicopter is a thrust vectoring rotor which not only supplies lifting forces, but also the forces needed for forward flight.