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Active Piezoelectric System using PCA

In previous works by the authors, an aircraft turbine blade was used to show that T^2 and Q-statistics formulation based on Principal Components Analysis (PCA) are successful indices to detect and distinguish damages. In this paper, authors considered the advantage of using PZT's as actuator as well as sensor. An active piezoelectric system is developed. In each phase of the diagnosis procedure, one PZT is used as actuator (a known electrical signal is applied) and the others are used as sensors (collecting the wave propagated through the structure at different points). An initial baseline model for undamaged structure is built applying Principal Component Analysis (PCA) to the data collected by several experiments. Current structure (damaged or not) is subjected to the same experiments, and the collected data are projected into the PCA model. Two of these projections and the damage indices (T^2-statistic and Q-statistic) by each phase are used as features for the final classification.

Ключевые слова:

Содержание.
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