

## **An ANN Approach for Detection and Localization of Fatigue Damage in Aircraft Structures**

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**Abstract :** In this paper we propose an ANN for detection and localization of fatigue damage in aircraft structures. We used network of piezoelectric transducers for Lamb-wave measurements in order to calculate damage indices. Data gathered by the sensors was given to neural network classifier. A set of neural network electors of different architecture cooperates to achieve consensus concerning the state of each monitored path. Sensed signal variations in the ROI, detected by the networks at each path, were used to assess the state of the structure as well as to localize detected damage and to filter out ambient changes. The classifier has been extensively tested on large data sets acquired in the tests of specimens with artificially introduced notches as well as the results of numerous fatigue experiments. Effect of the classifier structure and test data used for training on the results was evaluated.

**Keywords :** ANN, fatigue damage, aircraft structures, piezoelectric transducers, lamb-wave measurements

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