

Research On Damage Identification Of Plane Tensile Membrane Structure Based On Convolutional Neural Network

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How to accurately judge the damage of the current tensile membrane structure is the core part of the health monitoring of the current tensile membrane structure, and there are few related studies at present. Therefore, based on the convolutional neural network algorithm in deep learning, this paper studies the damage identification of the unidirectional tensioned planar membrane structure. In this paper, two damage indicators, modal strain energy change rate and mode shape plus frequency change rate, are used. Based on the finite element model of the plane tensioned membrane structure, combined with the experimental verification, the position and degree of the single damage and multi-damage conditions of the membrane surface were identified respectively. Studies have shown that the rate of change of modal strain energy is used as the index, and the accuracy rate is higher. The recognition accuracy is 96%, the degree recognition accuracy is 83%, and the multi-damage location recognition accuracy is more than 90%, and the degree recognition accuracy is 73%; although the latter has a lower accuracy, its damage index is in the modal It is easier to obtain in the test and has more practical application value.