Abstract :

The present work carries on the use of a method based on the wavelet transform to detect the internal flaws of composite materials. The objective of this work consists in working out a data processing sequence of an ultrasonic signal identifying nearly flaws in composite laminate materials and estimating their position. The use of a numerical signal processing technique, based on the Fast Wavelet Transforms is applied. The method is implanted and optimized for detection and classification of delamination and porosity flaws in manufactured materials. Since the information about the signal requires a large amount of computation time and resources, a technique is used to reduce the dimensions of the sampling signals. In Non-destructive evaluation of stratified composite materials, the identification of some defect features requires more recent and advanced methods than classical techniques. Notably, in thin composite materials, the reflected NDE ultrasonic signals are overlapping. As a result, the flaws evaluation is becoming unfeasible. Many works dedicated to advanced signal processing based on time-frequency analysis has been widely used in non-destructive evaluation (NDE) applications. To evaluate the nearly flaw detection of delamination and porosity enclosed in composite multilayer plate, the wavelet analysis is applied to ultrasound waveforms acquired by immersion pulse-echo technique. The obtained results offer some defect features relating their nature and position. The applied wavelet analysis provided excellent results for the investigated materials containing artificial delamination and porosity flaws