

# Signal Quality Improvement Using a New TMSSE Algorithm: Application in Delamination Detection in Composite Materials

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**Abstract:** This paper introduces a novel method to improve the quality of ultrasonic phased array signals for localizing with accuracy delamination defects. The improvement is achieved by the introduction of a new threshold for the Shannon energy. In first, we have applied the threshold modified S-transform algorithm (TMST) in the case of ultrasound B-scan. Thereafter, we have adapted and applied the S-transform Shannon energy (SSE) algorithm in the field of ultrasonic testing. At last, we have proposed a novel algorithm based on threshold modified S-transform and Shannon energy (TMSSE) to increase the improvement of the ultrasound B-scan. A simulation study has been carried out simulating a composite material containing three defects in different positions in order to highlight the phenomenon of delamination. Experimental tests were performed on a sample of carbon fiber reinforced polymer composite material (CFRP) with a delamination defect close to the front face. Both experimental and simulated results show that the proposed method can improve the quality of ultrasound B-scan which enhances the localization of delamination defects.

**Keywords :** Ultrasonic signal