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Detection of delamination defects in CFRP materials using ultrasonic signal processing

Abdessalem BENAMMAR, Redouane DRAI, Abderrezak GUESSOUM

Abstract: In this paper, signal processing techniques are tested for their ability to resolve echoes associated with delaminations in carbon fiber-reinforced polymer multi-layered composite materials (CFRP) detected by ultrasonic methods. These methods include split spectrum processing (SSP) and the expectation–maximization (EM) algorithm. A simulation study on defect detection was performed, and results were validated experimentally on CFRP with and without delamination defects taken from aircraft. Comparison of the methods for their ability to resolve echoes are made.

Keywords : Ultrasonic NDE, composite materials, CFRP, SSP, Deconvolution, EM algorithm