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Detection of Multiple Ultrasonic Echoes Reflected from Internal Flaws in Structures Using Advanced Signal Processing Techniques

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Abstract : In order to improve the detection accuracy of multiple ultrasonic echoes reflected from non homogeneous structure, we have used three advanced signal processing techniques, namely, empirical mode decomposition, wavelet analysis and split spectrum processing. Simulation results to detect multiple ultrasonic overlapping echoes contaminated by white Gaussian additive noise are presented, which demonstrate the feasibility of the proposed processing techniques for detecting multiple targets in such materials. An experiment technique was used to study the proposed processing schemes, in which a cubic shape mortar specimen was processed

Keywords : Non-Destructive testing, Empirical Mode Decomposition, Wavelet Analysis, split spectrum processing, multiple ultrasonic overlapping echoes