

Sparse Representations of Acoustic Emission Signal: Application to Damage Analysis in Glass Fiber Reinforced Composites

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Abstract : Sparse representation of signals has been subject of many advances during recent years especially in the field of applied physics. The problem is to search for the most compact representation of signals in terms of linear combinations of elementary waveforms in an over-complete dictionary. The underlying hypothesis in most of sparse representation problems is that if one can associate a sparse representation to a given signal, its structure reveals information directly linked to the physical nature of the addressed problem. From this point of view it has been shown that sparse representation problems have closed connections with inverse problems and source separation problems. In this contribution, an application of sparse representation techniques to identify damage mechanisms from Acoustic Emission (AE) signals is presented. The sparse representation is which is based on the continuous wavelet transform. All experiments concern investigations realized on glass fibre reinforced polymer composites (GFRP).

Keywords : acoustic emission, Signal processing, Ultrasonic, precursor damage