International Journal for Simulation and Multidisciplinary Design Optimization

Volume 2, Issue 2, 2008, Pages 107-111

Deconvolution of ultrasonic echoes using Bernoulli-Gaussian processes for composite materials inspection

Abdessalem BENAMMAR, Redouane DRAI, Abderrezak GUESSOUM, Ahmed KECHIDA

Abstract: In this work, we present an approach of deconvolution ill-posed problems of superimposed signals in time. A priori information must be taken into account to solve this problem. The a priori information translates the physical properties of the ultrasonic signals. The defect impulse response is modelled as a Bernoulli-Gaussian sequence. Deconvolution becomes the detection problem of the optimal Bernoulli sequence and estimation of the associated complex amplitudes. A simulation study on defect detection was realised, and results were validated experimentally on Carbon fiber-reinforced polymer multi-layered composite materials (CFRP) with and without delamination defects taken from aircraft.

Keywords : composite materials, blind deconvolution, processes BG