

DAMAGE DETECTION THROUGH WAVELET TRANSFORM AND INVERSE ANALYSIS

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Abstract. Methods of damage detection are expected to provide information whether damage exists or not. This work is concerned with methods to identify damage based on measurement of structural response to the actual actions or actions specially planned and applied to the existing defected structure. If the response of the existing structure is compared to the response of its computer model which contain parameters characterizing the expected defects. Different kind of responses can be monitored, namely displacements, velocities or accelerations, to construct the discrepancy function. Through the minimization of the differences between measurable quantities: (a) computed by the numerical model, and, (b) recorded on the existing damaged structure, the information on the defects can be assessed. Recently alternative approaches have been developed, in which the time-consuming optimization procedures can be avoided. In these approaches data processing techniques are applied only to the response signal of the existing defective structure. This group of techniques includes special methods of artificial intelligence or stochastic programming combined to signal processing techniques, e.g. Wavelet Transform (WT), in continuous form (CWT) or discrete (DWT).