

Plenary Presentation

JOINT TIME-FREQUENCY ANALYSIS IN STRUCTURAL DYNAMICS APPLICATIONS

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ABSTRACT

Traditional Fourier analysis has been an important tool in engineering applications for many years. However, it does not capture readily non-stationary and local features, which are inherently present in many structural dynamics problems. The lecture will focus on modern time-frequency analysis techniques for capturing localized effects and evolutionary frequency content by using wavelets, chirplets, and signal intrinsic modes. These techniques will be presented in context with earthquake engineering applications and they will be used for analyzing both historic ground accelerograms and linear/nonlinear seismic responses of benchmark systems. However, they are applicable as well to a plethora of other structural engineering, and engineering mechanics in general, themes.

A perspective on pitfalls of stochastic decision making will also be discussed.