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Vibroacoustic Modulation with Chirp Signal

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Abstract : By sending a high-frequency probe wave and a low-frequency pump wave to a specimen, the vibroacoustic method evaluates the defect's severity according to the modulation index of the received signal. Many studies experimentally proved the significant sensitivity of the modulation index to the tiny contact type defect. However, it has also been found that the modulation index was highly affected by the frequency of probe or pump waves. Therefore, the chirp signal has been introduced to the VAM method since it can assess multiple frequencies in a relatively short time duration, so the robustness of the VAM method could be enhanced. Consequently, the signal processing method needs to be modified accordingly. Various studies utilized different algorithms or combinations of algorithms for processing the VAM signal method by chirp excitation. These signal process methods were compared and used for processing a VAM signal acquired from the steel samples.

Keywords : vibroacoustic modulation, nonlinear acoustic modulation, nonlinear acoustic NDT&E, signal processing, structural health monitoring
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