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## Ultrasonic Measurements by Means of Continuous Waves in Porous Materials Saturated with Air

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The study of porous materials has always been of great interest. Several characterization methods have been developed by means of ultrasonic waves, mainly because of their non-invasive behavior. A typical set-up involves transmission and reflection measurements through the test material using pulse signals. The received echoes are analyzed and compared with analytical models in order to estimate some specific acoustic properties of the sample itself. The main drawback of this approach is the low signal-to-noise ratio recorded when testing highly attenuating materials. This disadvantage is even more pronounced for measurements in air.

The present work aims to overcome these limitations, replacing the excitation signals by continuous multi-harmonic waves. These signals have been developed by optimizing the phase of each harmonic, resulting in a low crest factor and consequently in a better signal-to-noise ratio [1,2]. Moreover their frequency content can be easily adapted to the different transducers used during the test. The method has been used to test a foam saturated with air, performing ultrasonic measurements in transmission/reflection, at different angles of incidence. The results show a significant improvement of the measurements, facilitating the estimation of the foam acoustics properties.

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### References:

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