Guide star in the speckle, mathematical framework for speed of sound reconstruction in medical ultrasound imaging.

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Abstract

We present a mathematical model for wave propagations in biological soft tissues, a description of effective acoustic parameters using stochastic homogeneization techniques. We then apply these results to describe the method proposed by A. Aubry and F. Bureau to recover the effective speed of sound from pulse echo measurements in medical ultrasound imaging. The method is based on building an estimator which assess the ability to focus waves in a microstructured medium. We derive an asymptotic developpment of the estimator and present numerical simulations matching experimental measurements.
Work in collaboration with J. Garnier, Q. Goepfert, L. Giovangigli & E. Parolin.

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