

Paper 17.6

Maximum likelihood approaches for sound field measurement using LDV

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ABSTRACT

Acoustic particle velocity can be estimated from the LDV measurement. The amplitude and phase of the velocity are inferred from adapted signal processing of the signal issue from the LDV set-up. Many investigations covering a wide range of signal processing method have been developed to analyze this signal, such as the adaptation to techniques developed in fluid mechanics based on the random sampling principle or photo-correlation estimation using the temporal amplitude variation. Time-frequency representations are also used to estimate velocity parameters using the estimation of the instantaneous frequency of the signal.

The best result obtained up to nowadays, in the configuration of low displacement of the particle, has been realized with the use of time-frequency estimators whose principle is related to parametric principle. So, to extend the estimation capability forward lower displacement, two parametric methods, the ML and LS estimators, using *a priori* information on signal, are adapted to allow the estimation of parameters velocity. Their estimation capabilities are evaluated on simulation signals and a preliminary confrontation to experimental signals is occurred.

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