

DAGA 2013

Title: Transfer function estimation with fluctuating noise

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Abstract:

When a transfer function has to be estimated in an acoustically adverse environment, a typical measure against the impact of uncorrelated noise is to average multiple measurements coherently. If the measured system response is disturbed by noise with time varying power, the normal coherent averaging is suboptimal. In this contribution the method of weighted averaging previously published by the author is used for estimating the transfer function. As shown in previous publications the optimal weights are directly related to the signal-to-noise ratio in the system response. For optimal averaging results accurate noise power estimates are needed for every measurement. For the noise power estimation a new method is proposed delivering more robust results than the so-called SWiC method (sliding window correlation) used previously. Furthermore, the averaging method is extended to also the signal power varying from measurement to measurement. The original application of this method is the acoustic function testing of the Eustachian tube, where strong transient disturbing sounds and time varying noise are present. However, the concept is general so that it is applicable to any system identification task.

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