测量系统误差对声场重构精度影响与修正方法

陆益民 刘正士 陈晓东 陈心昭

合肥工业大学

关键词： 声全息 声场重构 系统误差 传递函数 误差修正

摘 要： 分析了由声全息测量系统的幅值和相位误差而导致的全息复声压测量误差，推导出因这两类误差而导致的声场重构误差近似公式，提出了基于测量系统通道间传递函数的声场重构误差修正方法，给出了简洁的全息重构误差修正公式。用修正后的全息复声压重构出的声场与真实声场及重构误差之间具有简单的实比例关系和相同的分布，仿真算例验证了修正方法的有效性。 The error of complex sound pressure measured on acoustic holograph plane due to error of acoustical holograph measurement system, amplitude error and phase mismatch between different measuring channels, was analyzed, and an approximate error correction expression of holographic reconstruction was deducted. A correction method based on measuring system transfer function was proposed to correct the holographic data, by means of this method, a concise reconstruction's error expression could be obtained and there was a simple real proportion's relation between the true value of sound field reconstruction, estimate of sound field reconstruction and error of reconstruction. The effectiveness of educed error expression and error correction method were proved through numerical simulation.

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