A NEW K-SPACE OPTIMAL FILTER FOR ACOUSTIC HOLOGRAPHY

Jing-Fang Li\(^{(1)}\), Jean-Claude Pascal\(^{(2)}\), Claude Carles\(^{(1)}\)

\(^{(1)}\) Conservatoire National des Arts et Métiers (CNAM)  
Lab. Acoustique – 75003 Paris, France

\(^{(2)}\) Centre Technique des Industries Mécaniques (CETIM)  
BP 67, 60304 Senlis, France

ABSTRACT — The existence of noise in evanescent waves associated with backward propagation in acoustic holography is a cause of distortion of sound field reconstructions. An effective way is to apply a K-space filter to data set on the hologram. The use of these parametric windows remains empirical. In the present work, a more systematic approach is adopted by using a least-squares optimisation method combined with a condition whereby the integral of the total acoustic energy density (potential and kinetic) on the source plane is made to converge. This new optimal K-space filter obtained no longer depends on arbitrary parameters but on factors defined by the experimental conditions, such as the signal-to-noise ratio, the distance from the hologram to the source plane and the frequency of analysis. This window is compared with an existing empirical window.