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Temporal prediction of the acoustic radiation of vibrating structures: subjective evaluation of a simplified approach

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The goal of the approach presented in this paper is to predict the noise radiated by vibrating structures with acquired vibratory measurements, in the temporal field, on their surface. In the frequential field this prediction is based on the resolution of the Kirchhoff integral equation, which requires a lot of computing time and is thus limited to low and intermediate frequencies; the boundary element method (BEM) is used for the resolution. Simplifications were already brought to low ($<$ Flim1) and to high ($>$ Flim2) frequencies, leading to a simple calculation of a fast integral. The limiting frequencies (Flim1 and Flim2) depend on the structure dimensions and its position towards the observation point. In this paper we will present an approach developed in the temporal field in which a complete calculation (BEM) is avoided by choosing a minimal distance in order to have Flim1 = Flim2 and use only the simplified calculations. The vibratory data is measured in the temporal field and the studied structure is a parallelepipedic box excited by two mechanical excitation pots which excite one or two faces. The acoustic pressures calculated in the temporal field will be confronted with measurements, by using similarity subjective tests and integrating a variation of the principal parameters intervening in this approach.