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**Elaboration of a scattering matrix measurement procedure using  
the p-v probe**

Yamen Kchaou<sup>a</sup>, Mohamed Taktak<sup>a</sup>, Jean Michel Ville<sup>a</sup>, Mohamed Haddar<sup>b</sup> and Félix Foucart<sup>a</sup>  
<sup>a</sup>Université de Technologie de Compiègne, Centre de Recherche Royallieu, BP20529, 60205 Compiègne,  
France

<sup>b</sup>Unité de Modélisation, Mécanique et de Production (U2MP), Ecole Nationale d'Ingénieurs de Sfax, BP  
3038, 3038 Sfax, Tunisia

The scattering matrix which relates travelling waves amplitudes as state variables has been shown to be more attractive than transfer or mobility matrices since it reflects the fundamental duct nature: it gives a more complete description of the transmission, reflection and conversion properties of the duct. In the University of Technology of Compiègne, an experimental procedure was developed to measure this matrix: a p-p probe mounted on a set up designed during DUCAT project is used to measure pressures at two cross sections on the both side of the test lined duct, then by using a modal decomposition and separation techniques, the scattering matrix is deduced.

In this paper, a method to measure the multimodal scattering matrix based on the use of a p-v probe getting simultaneously the acoustic pressure and velocity at one section on the both side of the test duct is developed. A comparison of some acoustics values (scattering matrix coefficients, acoustic powers...) of a hard wall duct straight duct obtained by each technique with the theory is presented to evaluate its advantages and limitations.