

**ACOUSTICS2008/3621****Relations between acoustic parameters and perceptual properties:  
an approach by regressions tree applied to car door closure sounds**

Marie Céline Bezat<sup>a</sup>, Vincent Roussarie<sup>a</sup>, Richard Kronland-Martinet<sup>b</sup> and Solvi Ystad<sup>b</sup>

<sup>a</sup>PSA Peugeot Citroën, Centre Technique de Vélizy, Route de Gisy, 78943 Vélizy-Villacoublay, France

<sup>b</sup>CNRS-LMA, 31, chemin Joseph Aiguier, 13402 Marseille, France

The aim of this study is to identify perceptually pertinent parameters for the evaluation of car door closure sounds. For this purpose, door closing sounds are finely decomposed into perceptual properties: analytical properties (which are obtained thanks to sensory analysis), natural properties (linked to perception of sources and events) and evocations. The acoustic characterisation of the sound is then processed by means of an analysis-synthesis model which aims, not at reproducing the exact replica of the door closing sounds, but to synthesize sounds that preserve perceptual properties with a reduced number of signal parameters. The model consists in decomposing the sound in several independent impact sources, each impact being modelled by a set of gains and damping factors in frequency bands. Listening tests on controlled sounds are then carried out to observe the effects of acoustic parameters on the perceptual properties. The complex relations between acoustic parameters and perceptual properties are finally established via regressions tree analyses.