

**ACOUSTICS2008/3598**  
**Reduced models for elastoacoustic problems with intelligent interfaces**

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Effective and predictive noise and vibration modelling and design tools as well as efficient and high-performance materials are essential to produce world-leading products with regards to the noise and vibration quality. In one hand, the modern trend towards virtual design and prototyping requires good analysis and modelling tools in the entire noise frequency band. In another hand, new passive, adaptive or active materials offer improved technologies issues for the vibration and noise treatment. However, there is still a lack of efficient numerical tools in the low frequency band, and an absence of tools in the mid-frequency range. Moreover, although new materials potential can be demonstrated in prototype structures, their performances are still insufficient in integrated applications. To bring advances in noise and vibration treatment using new materials, the challenge is to be capable of supporting specific aspects related to advanced materials and virtual prototyping methods. An essential requirement for this is a multi-disciplinary analysis and coupled simulation tools where effects on a very different scale need to be interconnected. The paper proposes reduced models of elastoacoustic problems with localised intelligent interface. The main focus is development of fast simulation tool for the design of new systems. Theoretical as well as numerical experiments are offered in this work.