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THE VIBRO-ACOUSTIC SIMULATION OF MULTI-COMPONENT SYSTEMS

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ABSTRACT

In order to assess the mechanical performances of his products, Hutchinson is increasing continuously the resources devoted to simulations and experiments. Vibro-acoustic performances of components and systems designed by Hutchinson (engine mounts, suspension parts ...) are the key issues in acoustic and vibration passenger comfort.

Acoustic and structural codes have been tightly coupled thus enabling the simulations of full systems, and making it possible to model as precise as possible their realistic environment. Applications to three product families are presented:

Car body sealing: vibroacoustic simulation of car door window including the adjacent components such as window run channel, lift-glass device etc., acoustic transparency of sealing system for car door with double or triple sealing. Several discretization approaches, and in particular the boundary and the infinite element methods, used in acoustic modelling have been compared.

Vibration isolation: dynamic simulations of individual components or complete systems such as engine suspension of full vehicle suspension have been performed. Results obtained by means of simulation are often compared with experimental results.

Fluid transfer: shape optimisation of resonators and silencers for air intake systems and vibration analysis of air conditioning and engine cooling system hoses.

Note: for more information about this work, please contact the authors.