



## Modelling of Mechanical Systems: Fluid-Structure Interaction: 3

*By Francois Axisa, Jose Antunes*

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Francois Axisa, Jose Antunes

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**Bibliography**

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## **Editorial Review**

### **From the Back Cover**

The study of fluid-structure interactions in this third volume covers the coupled dynamics of solids and fluids, restricted to the case of oscillatory motions about a state of static equilibrium. Fluid motion induced by a vibrating structure results from various distinct coupling mechanisms operating together but with a relative importance which varies enormously from one case to the other. Physical and mathematical aspects of modelling these mechanisms are described in depth and illustrated by numerous worked out exercises. As in Volumes 1 and 2, whilst focusing on linear problems, a few nonlinear problems are also included. Chapter 1 gives a preview to the subject. Chapter 2 deals with the inertial coupling which can modify profoundly the ‘in vacuo’ natural frequencies and mode shapes of the structure. Chapter 3 describes the surface waves at a liquid-gas interface, focusing on gravity waves, sloshing modes and their coupling to vibrating structures. Chapter 4 is devoted to plane acoustical waves in piping and duct networks. The subject is extended in Chapter 5 to the cases of 2D and 3D sound waves in waveguides and large enclosures. The vibroacoustic coupling mechanism is analysed in Chapter 6, which addresses in particular the numerical methods of interest for engineering applications. Finally, Chapter 7 presents various dissipative effects including radiation damping and dissipation due to the viscosity of the fluid. The subject serves, in particular, as a preliminary to the non conservative fluid-structure interaction mechanisms encountered in flow-induced vibration problems which will make the subject of Volume 4 of this series.

### **About the Author**

François Axisa is Professor of Mechanical Engineering at ENSTA, France, and holds a research post in flow-induced vibration problems at Centre d’Etudes Nucleaires de Saclay, France. He is the author of more than 50 papers on vibrations, damping and associated subjects and has been involved in numerous international conferences and meetings.

José Antunes is researcher at the Institute of Nuclear Technology (ITN, Portugal), in charge of the Applied Dynamics Laboratory, and for twenty years visiting researcher at Centre d’Etudes Nucleaires de Saclay (CEA, France). A PhD in mechanics from Paris University, he co-authored a book and more than fifty peer-reviewed scientific publications in the fields of flow-induced vibrations, nonlinear dynamics, system identification and music acoustics. His work was awarded two ASME prizes.

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