

Research activities in smart materials and structures represent a significant potential for technological innovation in mechanics and electronics.

The necessity of controlling vibroacoustic behavior of industrial systems motivates a broad research effort for introducing active or passive technologies to control noise and vibrations.

New processes are now available which allow active transducers and their driving electronics to be directly integrated into otherwise passive structures.

This new approach could allow fine control of the material physical behavior for implementing new functional properties that do not exist in nature.

In this sense, we can speak of "integrated distributed adaptive metacomposites" that merges with the notion of programmable material or material by design.

Through two different examples dealing with active acoustical impedance and elastodynamical interface, this seminar presents used theoretical tools for designing specific applications of this new technology. Experimental results are also used to validate the proposed methodologies.