



Co-funded by the Horizon 2020 programme of the European Union

Module 3: Wave propagation in complex systems

Lecturers: Andrés Prieto Aneiros, Luis Hervella Nieto

Syllabus: Module on Wave Propagation Modeling in Complex Systems is focused on the derivation and the analysis of mathematical models of acoustic and structural vibrations of elastic solids and porous media. Coupling problems involving fluid-structure interaction and damping materials will also be addressed.

Teaching hours/lecture: 13.5 h

Contents:

# Lecture	Schedule	Lecturer	Content
1	July 3, 9:00-10:30 (1,5h)	Andrés Prieto Aneiros	From Cauchy Theorem to linear vibration equations in Lagrangian coordinates
2	July 3, 10:30-12:00 (1,5h)	Andrés Prieto Aneiros	Wave motion in acoustic fluids and elastic solids: time-harmonic vibrations
3	July 3, 12:30-14:00 (1,5h)	Luis Hervella Nieto	Variational formulation of time-harmonic vibration problems: Fredholm's alternative
4	July 4, 9:00-10:30 (1,5h)	Andrés Prieto Aneiros	Resonance and frequency response functions of vibro-acoustic problems: Levels
5	July 4, 10:30-12:00 (1,5h)	Luis Hervella Nieto	Coupling vibrations between fluids and elastic solids: mixed and pure displacement problems
6	July 4, 12:30-14:00 (1,5h)	Luis Hervella Nieto	Coupling vibrations involving thin structures: Reissner-Mindlin plates
7	July 5, 9h-10:30 (1,5h)	Andrés Prieto Aneiros	Wave motion in presence of flow: Euler and Galbrun models
8	July 5, 10:30-11:30 (1h)	Andrés Prieto Aneiros	Wave motion in rigid porous and poro-elastic materials: Darcy's like and Biot models
9	July 5, 12:00-14:00 (2h)	Luis Hervella Nieto	Wave propagation at far field: absorbing boundary conditions and Perfectly Matched Layers



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