

Nador (Maroc), 01-10 Juin 2020

Equations aux dérivées partielles non-linéaires, théorie spectrale et applications

Cours :

Pavel EXNER (Czech Technical University, République Tchèque)

Titre : Quantum graphs and waveguides

Résumé : The aim of this series of lectures is to present an overview of the rapidly developing field of modeling nanostructures by investigation of quantum particles confined to subsets of the configuration space having a nontrivial geometry and topology. The contents of the mini-course will be the following:

Lecture I - The concept of a quantum graph its history, basic notions, self-adjoint vertex couplings

Lecture II - Spectral and scattering properties of quantum graphs. Periodic graphs and their spectra

Lecture III - Quantum waveguides and layers, their geometrically induced spectral properties

Lecture IV - Physical meaning of the vertex coupling, explained through squeezing network approximations

Lecture V - Leaky structures as an alternative quantum graph model

Lecture VI - Resonances in quantum graphs and waveguides