

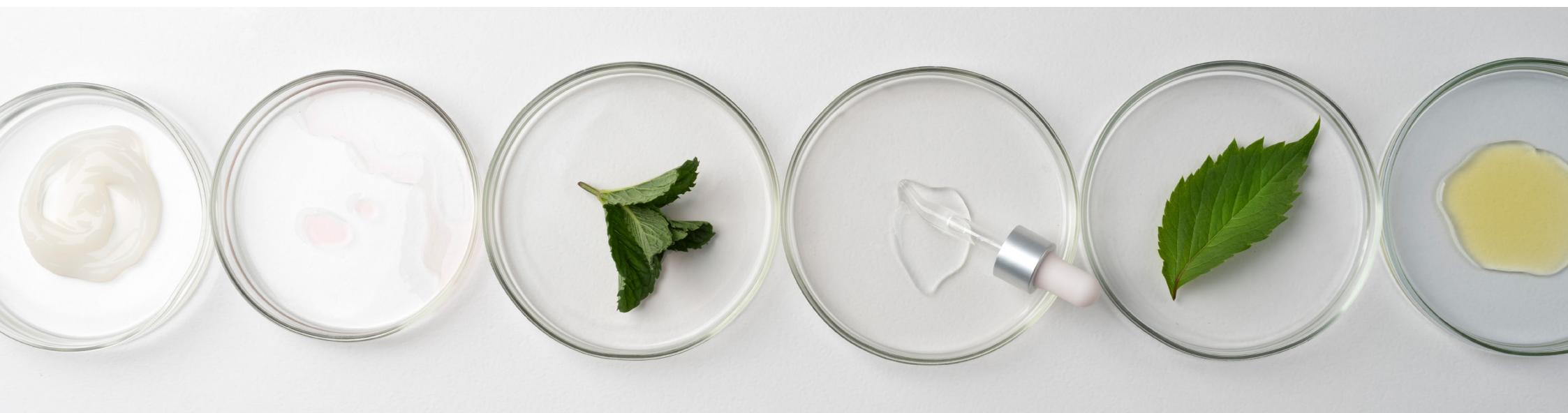


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EffectFact-FAA

September 19, 2023, Online Seminars in Venice

Zoom link: <https://unive.zoom.us/j/87191873889> | Passcode: EfFaFAA1

10.30-11.10

***The Functional Analytic Approach
for regular domain perturbations***

Paolo Luzzini

Università degli Studi di Padova

Perturbation problems for PDEs have been widely studied with several different techniques due to a variety of concrete and theoretical applications that they have. In the present talk I will explain through some examples how the Functional Analytic Approach can be exploited to deal with boundary value problems subjected to a regular perturbation of the domain. In particular, I will tackle the problem of studying the behavior of the effective conductivity of a two-phase composite material when one perturbs the shape of the inclusions, its periodicity structure, and the conductivity parameters.

11.10-11.50

***The Functional Analytic Approach
for singular domain perturbations***

Matteo Dalla Riva

Università degli Studi di Palermo

We discuss the pros and cons of using the Functional Analytic Approach to study boundary value problems in singularly perturbed domains. Our primary focus will be on the geometric aspects of perturbations. Specifically, we will observe that the approach is very efficient when dealing with small holes that diminish

in size and shrink into points. However, addressing different types of perturbations requires specific strategies. Then, we will review some old and new results aiming at extending the geometric applicability of the approach. At the end of the talk, we will outline some potential future perspectives.

14.30-15.10 *

***Multi-parameter perturbations for
the space periodic heat equation:
a Functional Analytic Approach,***

Riccardo Molinarolo

Università Ca' Foscari Venezia)*

In this talk we study a transmission problem for the heat equation in a periodic two-phase composite material: we show that the solution depends smoothly on the shape of the transmission interface, boundary data, and conductivity parameters. The analysis is based on a generalization to the periodic setting of previously known results, namely periodic layer heat potentials depend smoothly on regular perturbation of the support of integration.

15.10-15.50 *

***The Functional Analytic Approach
for degenerating boundary value
problems***

Paolo Musolino

Università Ca' Foscari Venezia

In this talk, we present some recent

applications of the FAA to the study of boundary value problems with degenerating boundary conditions. First we consider the behavior of the solutions of a mixed problem for the Laplace equation in a domain \mathbb{R}^n . On a part of the boundary \mathbb{R}^n we consider a Neumann condition, whereas in another part we consider a nonlinear Robin condition which depends on a positive parameter δ in such a way that for $\delta = 0$ it degenerates into a Neumann condition. We describe what happens to the solution $u(\delta, \cdot)$ as $\delta \rightarrow 0$ by means of representation formulas in terms of real analytic maps. Then we consider the case when the part of the boundary where the Robin condition is imposed shrinks to 0. Finally, we will show how some of the above described results can be extended to the case of a degenerating Robin traction problem for the Lamé equations in a periodically perforated domain.

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