

**Università degli Studi di Pavia**

**Dipartimento di Meccanica Strutturale**

In collaborazione con

**Centro di Simulazione Numerica Avanzata – CeSNA**

**Istituto Universitario di Studi Superiori**

## **Topology Optimization with Isogeometric Analysis in a Phase Field Approach**

Structural topology optimization consists in finding the optimal distribution of a material in a given design domain in order to minimize an objective functional under certain constraints. In particular, in the "minimum compliance" case the goal is finding the stiffest structure for a given load and with a limited amount of material. For the solution of these problems, we consider a phase field approach for the smooth description of the material properties in the design domain and to provide geometric information via interfaces between the material and the void. With this aim, a Cahn-Hilliard type penalty term is added to the objective functional. In this manner the solution of the topology optimization problem can be obtained as the steady state of a phase transition model based on the generalized Cahn-Hilliard equations. We solve these equations by means of Isogeometric Analysis which allows closing the gap between the geometry, the analysis and the optimization procedure without the introduction of any geometrical approximations of the design domain. Finally, shape optimization can be performed in order to further improve the stiffness of the optimal topologies obtained.

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*Tuesday April 27, Aula MS1, 15.00 – 16.00*

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