Bounds on Effective coefficients
by **Cristian Barbarosie**

It is of major importance in optimization and homogenization to describe the set of all effective tensors that can be obtained by mixing together a number of base materials, in given proportions. This problem, known as *G-closure problem*, or *the problem of bounds*, has already a long history. A first result, due to A. Cherkaev, K. Lurie, F. Murat and L. Tartar, characterizes the set of attainable conductivity matrices for binary mixtures (composites made of two isotropic materials). Many other authors have obtained bounds on the effective coefficients in different frameworks like linear elasticity, thin structures or composites with interfaces. Another direction of research is to consider more than two component materials. The computation of bounds for these frameworks turns out to be a highly non-trivial problem, and in many cases it is still an open problem. This talk will describe a method for computing bounds on the effective conductivity matrix for a mixture made of a (possibly infinite) family of isotropic materials. The proportions of materials are given through a Young measure, and the problem of bounds reduces to describing the relation between this measure and the effective tensor. The bounds are first deduced for periodic mixtures. By using arguments of compensated compactness and fine properties of Young measures, the same bounds can be obtained for the general (non-periodic) case.