

Duality relations and Homogenization in a linear and nonlinear setting
by **Gilles Francfort**

The Keller-Dykhne relation states that the overall conductivity of a checkerboard made of two conductors with conductivity a and b is the square root of ab .

In this conference we reexamine this relation and generalize it to a non-linear setting, then investigate the setting of non-linear incompressible elasticity.

The basic tool for the derivation of this type of exact relations is an analysis of the interplay between the homogenization limit of a family of operators and that of its inverse, which in dimension 2 is intimately linked to the fact that a 90 degree rotation changes a gradient into a divergence-free field.