

# Stochastic Homogenization via Scale Integration and Applications

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In this talk I will present a recent result [2] obtained in collaboration with Stefano Marini (Brescia, Italy) and Marco Veneroni (Pavia, Italy) concerning the homogenization of a stationary random maximal monotone operator on a probability space equipped with an ergodic dynamical system. The proof relies on Fitzpatrick's variational formulation of monotone relations [1], on Visintin's scale integration/disintegration theory [3] and on the well known Tartar-Murat's compensated compactness. I will provide also applications to systems of PDEs with random coefficients arising in electromagnetism and in nonlinear elasticity.

## References

- [1] Simon Fitzpatrick, Representing monotone operators by convex functions, in Workshop/Miniconference on Functional Analysis and Optimization, (1998), Volume 20 (eds. Centre for Mathematics and its Applications, Mathematical Sciences Institute, The Australian National University), pp. 59–65.
- [2] Luca Lussardi, Stefano Marini, Marco Veneroni, Stochastic homogenization of maximal monotone relations and applications, Networks and Heterogenous Media (2018), Volume 13, Issue 1, pp. 27–45.
- [3] Augusto Visintin, Scale-integration and scale-disintegration in nonlinear homogenization, Calculus of Variations and Partial Differential Equations, (2009), Volume 36, Issue 4, pp. 565–590.