

Seminario

STOCHASTIC PRESSURE EQUATION IN ENHANCED GEOTHERMAL HEATING

tenuto dal

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Abstract:

In this talk I will explain how a certain stochastic pressure equation appears in modelling enhanced geothermal heating (EGS) and how we approach the existence problem. EGS consists of pushing water through crystalline crustal rock at depths of 6-8km, the heat from the rock can then be extracted. Based on empirical observations it seems that the porosity satisfies a log like correlation from at least mm to km scale, the permeability (diffusion coefficient) is assumed to be the exponential of permeability. As a "simple" model, we model the porosity using a Gaussian log-correlated field, the properly normalized exponential thus becomes the so-called multiplicative chaos measure. Using Gaussian analysis, we transform the Wick renormalized stochastic problem into a family of weighted elliptic equations, and I will show how regularity of these equations imply existence for the stochastic solution. Joint work with: Benny Avelin (Uppsala), Tuomo Kuusi (Helsinki), Patrik Nummi (Aalto), Eero Saksman (Helsinki), and Lauri Viitasaari (Aalto).

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