



Modeling space anisotropy and non-stationarity via Partial Differential Equations

Laura Azzimonti
MOXOFF, Milano, Italy – laura.azzimonti@moxoff.com

Laura M. Sangalli
MOX, Dipartimento di Matematica, Politecnico di Milano, Italy – laura.sangalli@polimi.it

Piercesare Secchi
MOX, Dipartimento di Matematica, Politecnico di Milano, Italy –
piercesare.secchi@polimi.it

We propose a novel approach to spatial statistics consisting in regression models with partial differential regularizations. The Partial Differential Equation (PDE) is used to model the space variation of the phenomenon, using problem-specific prior information. The proposed PDE modeling allows for important flexibility in this respect, accounting also for space anisotropy and non-stationarity in a straightforward way, as well as unidirectional smoothing effects. The method is illustrated in various applied contexts.

Keywords: space-anisotropy; non-stationarity; partial differential equations; finite elements.