Scaling transition for nonlinear random fields with long-range dependence

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Abstract. [1], [2] introduced the notion of scaling transition for stationary random fields X on $\mathbb{Z}^2$ whose normalized partial sums on rectangles with sides growing at rates $O(n)$ and $O(n^\gamma)$ tend to an operator scaling random field V_γ on $\mathbb{R}^2$, for any $\gamma > 0$. The scaling transition is characterized by the fact that there exists a unique $\gamma_0 > 0$ such that the scaling limits V_γ are different and do not depend on γ for $\gamma > \gamma_0$ and $\gamma < \gamma_0$. It appears that scaling transition is a general phenomenon, suggesting an exciting new area in spatial research. The talk obtains a complete description of anisotropic scaling limits and the existence of scaling transition for nonlinear functions (Appell polynomials) of stationary linear random fields on $\mathbb{Z}^2$ with moving average coefficients decaying at possibly different rate in the horizontal and vertical direction.

References

[1] Puplinskaitė, D. and Surgailis, D. (2015) Scaling transition for long-range dependent Gaussian random fields. Stochastic Process. Appl. 125, 2256–2271.

[2] Puplinskaitė, D. and Surgailis, D. (2016) Aggregation of autoregressive random fields and anisotropic long-range dependence. Bernoulli 22, 2401–2441.