



# Aggregation of autoregressive random fields and anisotropic long memory

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We introduce the notion of anisotropic long memory for random fields on  $\mathbb{Z}^2$  whose partial sums on incommensurate rectangles with sides growing at different rates  $O(n)$  and  $O(n^{H_1/H_2})$ ,  $H_1 \neq H_2$  tend to an operator scaling random field on  $\mathbb{R}^2$  with two scaling indices  $H_1, H_2$ . The random fields with such behavior are obtained by aggregating independent copies of a random-coefficient nearest-neighbor autoregressive random fields on  $\mathbb{Z}^2$  with i.i.d. innovations belonging to the domain of attraction of  $\alpha$ -stable law,  $0 < \alpha \leq 2$  with a scalar random coefficient  $A$  (the spectral radius of the corresponding autoregressive operator) having a regularly varying probability density near the 'unit root'  $A=1$ . The proofs are based on a study of scaling limits of the corresponding lattice Green functions.

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