

SUMMABILITY OF JOINT CUMULANTS OF NONINDEPENDENT LATTICE FIELDS

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In this joint work with Matteo Marcozzi and Alessia Nota (<https://arxiv.org/abs/1601.08163>), we prove a general result concerning how "asymptotic independence" of two random fields, more precisely the decay of their correlation functions, restricts the decay of joint correlations between these two fields. More precisely, we prove that absolute summability of the (marginal) correlation functions of two lattice fields implies ℓ_2 -summability of their joint correlations. In fact, the result concerns clustering norms of these fields, and hence also applies to fields which have a spatially homogeneous distribution.

The latter setup is relevant in particular in the case which served as the original motivation for the work, namely, a derivation of a priori bounds for equilibrium time-correlation functions. A key role in the proof is played by the properties of non-Gaussian Wick polynomials and their connection to cumulants.