

# Limit theorems for p-domain functionals of stationary Gaussian fields

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## Abstract

We investigate central and non-central limit theorems for integral functionals of subordinated Gaussian fields on the Euclidean space, as the integration domain grows. In particular, we consider the case of p-domain functionals, where the domain can be written as the Cartesian product of p domains that (possibly) grow at different rates. First, we assume that the covariance function of the Gaussian field is separable and thoroughly investigate under which conditions the study of p-domain functionals can be reduced to that of some simpler and classical one-domain functionals. When the considered functionals are in a fixed Wiener chaos, we also provide a quantitative version of the previous result, which improves some bounds in the literature. Second, we extend our study beyond the separable case, by investigating what can be inferred when the covariance function is either in the Gneiting class or is additively separable. Based on a joint work with Nikolai Leonenko, Ivan Nourdin and Francesca Pistolato.