

## Excursion decompositions for random distributions

Juhan Aru

Given a continuous function  $f$  from some domain to the reals, we can decompose the domain into disjoint sets  $\{f = 0\}$ ,  $\{f > 0\}$ ,  $\{f < 0\}$ . For a 1D Brownian motion  $B$ , such an excursion decomposition has been well studied and has many beautiful properties.

In this talk we discuss some examples of random fields, that are only generalized functions, but still admit meaningful decompositions into excursion sets. Our main example will be the 2D continuum Gaussian free field, for which a rather complete picture can be obtained. We will also discuss other examples and try to understand if this is all just mathematically pleasing or could be useful too.

Based on joint works with T. Lupu and A. Sepúlveda.