Mass-stationarity for random measures in $\mathbb{R}^d$

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A random measure in d dimensions is stationary if its distribution does not change under deterministic shifts of the origin: thus the origin is a typical location in space. We shall present the concept of 'mass-stationarity' which means (informally) that the origin is a typical location in the mass.

Mass-stationarity is an extension of the concept of 'point-stationarity' for simple point-processes. Formally, point-stationarity means that the distribution of the point process does not change under bijective (randomized) point-shifts from one point of the process to another. See Thorisson (2000) and Heveling and Last (2004) for background on point-stationarity. This definition can be extended to random measures by saying that the random measure is *mass-stationary* if its distribution does not change under (randomized) shifts of the origin provided the induced mass-transport is bijective and measure-preserving.

In this talk we shall start with discussing bijective point-shifts in the simple case of the Poisson process, first on the line and then in space. We then move to general point processes, and finally to general random measures. It turns out that similar Palm-relationships hold between stationarity and mass-stationarity as that hold between stationarity and point-stationarity.

References

[1] M. Heveling and G. Last (2005). Characterization of Palm measures via bijective point-shifts. *Ann. Probab.* **33**, 1698–1715.

[2] H. Thorisson (2000). *Coupling, Stationarity, and Regeneration.* Springer, New York.