

LARGE RANDOM SIMPLICIAL COMPLEXES

LEWIS MEAD

Random simplicial complexes extend the highly studied Erdős-Rényi model for random graphs to a high-dimensional analogue and have been increasingly studied over the past 15 years. In this talk I will introduce general models of random simplicial complexes which are constructed from a random hypergraph process. The general models presented in this talk include other well studied probabilistic models of random simplicial complexes from Costa-Farber [1], Kahle [2], and Linial-Meshulam [3] as special cases. Added generality in these new models introduces further complications and difficulties to fully understand the structure beneath. However elementary steps to pin down random topological properties such as estimating face numbers, connectivity thresholds, describing Betti numbers, and a duality between the models has been achieved. The talk will conclude with plans of some future work and interesting open questions. This talk is based on joint work with Michael Farber and Tahl Nowik.

REFERENCES

- [1] A. Costa, M. Farber: *Random simplicial complexes*, Springer INdAM Series, **14**, (2015), 129–153.
- [2] M. Kahle: *Topology of random clique complexes*, Discrete Math., **309**, (2009), 1658–1671.
- [3] N. Linial, R. Meshulam: *Homological connectivity of random 2-dimensional complexes*, Combinatorica, **26**, (2006), 475–487.

(L. Mead) QUEEN MARY UNIVERSITY OF LONDON, MILE END RD, LONDON, E1 4NS
Email address: lewis.mead@qmul.ac.uk