

# THE BETTI NUMBERS OF AN INTERSECTION OF RANDOM QUADRICS

**Erik Lundberg**

Florida Atlantic University, USA  
elundber@fau.edu

Let  $X$  be an intersection of  $k$  quadrics chosen at random from the so-called Kostlan ensemble. As the number of variables increases, we study the asymptotics of each Betti number of  $X$  and show that the expected  $i$ th Betti number is asymptotically one. In particular, an intersection of quadrics is asymptotically connected on average. In the case of an intersection of  $k = 2$  quadrics, we give additional detail on the sum of all Betti numbers, providing an asymptotic with two orders of precision. The proofs apply the Agrachev-Lerario spectral sequence from Algebraic Topology combined with results from Random Matrix Theory. The case of three quadrics leads to considering a new model for random curves based on determinantal representations.

*Joint work with Antonio Lerario (Lyon 1, France).*