Stochastic Geometry and Modeling of Wireless Networks

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The geometry of the location of users and/or base stations plays a key role in several classes of wireless communication networks, such as CDMA networks or mobile ad hoc networks (MANETs), where it determines the signal to noise or signal to interference ratio for each potential communication and hence the possibility of establishing simultaneously some set of communications at a given bit rate.

Stochastic geometry provides a natural way of defining and computing macroscopic properties of such networks, by some averaging over all potential geometrical patterns for the mobiles, in the same way as queuing theory provides averaged response times or congestion over all potential arrival patterns within a given parametric class.

The talk will survey recent results obtained by this approach for analyzing geometrical properties of these wireless networks such as coverage or connectivity, and for optimizing admission and multiple access control protocols used within this context.