SPATIAL STOCHASTIC MODELS OF HETEROGENEOUS CELLULAR NETWORKS WITH REPULSIVELY DEPLOYED BASE STATIONS

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We consider spatial stochastic models of downlink heterogeneous cellular networks (HCNs) with multiple tiers, where the base stations of each tier have a particular spatial density, transmit power, path-loss exponent and bias towards admitting mobile users. Existing works on such spatial models of HCNs assume, due to the tractability, that the base stations are deployed according to homogeneous Poisson point processes (PPPs). This means that the base stations are deployed independently with each other and their spatial correlation is ignored. In this talk, we propose two spatial models for the analysis of downlink HCNs, in both of which the base stations are deployed according to α-Ginibre point processes (α-GPPs). The α-GPP is one of the determinantal point processes and accounts for the repulsion between the base stations. Besides, the degree of repulsion can be adjusted according to the value of $\alpha \in (0, 1]$ and it is known that the α-GPP converges in law to a homogeneous PPP as $\alpha \to 0$. For such proposed models, we derive computable integral representations for the coverage probability of a typical mobile user—the probability that the downlink signal-to-interference-plus-noise ratio (SINR) for the typical user achieves a target threshold. We also exhibit the results of some numerical experiments.