Bipodal random graphs above Erdos-Renyi

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Abstract

We consider large dense random graphs on N vertices in which the density of an associated sub-graph H (say, a triangle) is slightly higher than would be expected for an Erdos-Renyi graph. We prove that as $N \to \infty$, the structure of the random graph becomes "bipodal". This means that there are two classes of vertices, say red and blue, and fixed edge probabilities for red-red, red-blue, and blue-blue edges. Furthermore, this phenomenon is universal, in that similar results apply for all choices of the sub-graph H.