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The average size of independent vertex/edge sets of a graph

In this talk, we characterize both the average size of independent vertex sets and independent edge sets of a graph. These invariants are the logarithmic derivative of the independence (resp. matching) polynomial evaluated at one. We show that although they are not monotone, under an addition or a removal of an edge, like the number of vertex (resp. edge) independent sets, the extremal graphs remain the same for general graphs (the empty and complete graph) and the class of trees (the star and the path).