Given a graph G and a subset S of the vertex set of G, the discrepancy of S is defined as the difference between the actual and expected numbers of the edges in the subgraph induced on S. We show that for every graph with n verticesand e edges, $u < e < n(n-1)/4$, there is an $n/2$-element subset with the discrepancy of the order of magnitude of $\sqrt{n}$. For graphs with fewer than n edges, we calculate the asymptotics for the maximum guaranteed discrepancy of an $n/2$-element subset. We also introduce a new notion called "bipartite discrepancy" and discuss related results and open problems.

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05C99 Graph theory

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discrepancy; numbers of the edges