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Ramsey problems involving degrees in edge-colored complete graphs of vertices belonging to monochromatic subgraphs. (In English)

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This note concerns the degrees of vertices in the monochromatic subgraphs guaranteed by Ramseyian theorems. There are two theorems, using colorings g of edges into colors red and blue. Given a graph G, let R be the graph of red edges and B the graph of blue edges. Let $\deg_G(x)$ be the degree of the vertex x in G. Given a regular graph G on vertices $x \in X$, let $\Delta_G = \max_{x\in X} \deg_G(x) - \min_{x\in X} \deg_G(x)$. If we color the edges of G red and blue, then $\Delta_B = \Delta_R$, and we denote this common "degree spread" Δ_γ, where γ is the coloring. The first theorem is a formula for the minimal degree spread of vertices in the monochromatic subgraphs guaranteed by Ramsey's theorem. Given a graph G and a 2-coloring γ of its vertices, let $\deg_R(x)$ be the degree of x in R. The second theorem states that for any m, if $n = n(m)$ is sufficiently large, then any 2-coloring of the clique K_n admits a monochromatic bipartite $K_{n,m}$ with two vertices x and y such that $\deg_R(x) = \deg_R(y)$. This is also true of cycles C_m.

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05C55 Generalized Ramsey theory
05C15 Chromatic theory of graphs and maps

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monochromatic subgraphs; coloring; Ramsey's theorem