SCMS Seminar

DECOMPOSING C4-FREE GRAPHS UNDER DEGREE CONSTRAINTS

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Abstract: A celebrated theorem of Stiebitz asserts that any graph with minimum degree at least s + t + 1 can be partitioned into two parts which induce two subgraphs with minimum degree at least s and t, respectively. This resolved a conjecture of Thomassen. In this paper, we prove that for s, t $\geqslant$ 2, if a graph G contains no cycle of length four and has minimum degree at least s + t - 1, then G can be partitioned into two parts which induce two subgraphs with minimum degree at least s and t, respectively. This improves a result of Diwan, where he proved the same statement for graphs of girth at least five. Our proof also works for the case of variable functions, in which the bounds are sharp as showing by some polarity graphs. As a corollary, it follows that any graph containing no cycle of length four with minimum degree at least k + 1 contains k vertex-disjoint cycles.