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**Decomposing  $C_4$ -free graphs under degree constraints.** (English) Zbl 1414.05239  
J. Graph Theory 90, No. 1, 13-23 (2019).

Summary: A celebrated theorem of *M. Stiebitz* [ibid. 23, No. 3, 321–324 (1996; [Zbl 0865.05058](#))] asserts that any graph with minimum degree at least  $s + t + 1$  can be partitioned into two parts that induce two subgraphs with minimum degree at least  $s$  and  $t$ , respectively. This resolved a conjecture of Thomassen [*C. Thomassen*, ibid. 7, 165–167 (1983; [Zbl 0515.05045](#)); in: Selected topics in graph theory, Vol. 3, 97–131 (1988; [Zbl 0659.05062](#))]. In this article, we prove that for  $s, t \geq 2$ , 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 that induce two subgraphs with minimum degree at least  $s$  and  $t$ , respectively. This improves the result of *A. A. Diwan* [J. Graph Theory 33, No. 4, 237–239 (2000; [Zbl 0942.05055](#))], 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.

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**MSC:**

- [05C70](#) Edge subsets with special properties (factorization, matching, partitioning, covering and packing, etc.)
- [05C07](#) Vertex degrees

Cited in 4 Documents

**Keywords:**

$C_4$ -free graphs; degree constraints; feasible partition; Stiebitz's theorem

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