

**Cranston, Daniel W.**

**Multigraphs with  $\Delta \geq 3$  are totally- $(2\Delta - 1)$ -choosable.** (English) Zbl 1221.05133  
Graphs Comb. 25, No. 1, 35-40 (2009).

Summary: The total graph  $T(G)$  of a multigraph  $G$  has as its vertices the set of edges and vertices of  $G$  and has an edge between two vertices if their corresponding elements are either adjacent or incident in  $G$ . We show that if  $G$  has maximum degree  $\Delta(G)$ , then  $T(G)$  is  $(2\Delta(G) - 1)$ -choosable. We give a linear-time algorithm that produces such a coloring. The best previous general upper bound for  $\Delta(G) > 3$  was  $\lfloor \frac{3}{2}\Delta(G) + 2 \rfloor$ , by *O. V. Borodin, A. V. Kostochka, and D. R. Woodall* ["List edge and list total colourings of multigraphs," J. Comb. Theory, Ser. B 71, No.2, 184–204 (1997; Zbl 0876.05032)]. When  $\Delta(G) = 4$ , our algorithm gives a better upper bound. When  $\Delta(G) \in \{3, 5, 6\}$ , our algorithm matches the best known bound. However, because our algorithm is significantly simpler, it runs in linear time (unlike the algorithm of [loc. cit.]).

**MSC:**

05C15 Coloring of graphs and hypergraphs

**Keywords:**

choosability; list coloring; total coloring; multigraph

**Full Text:** [DOI](#) [arXiv](#)

**References:**

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