

# $(2P_2, K_4)$ -Free Graphs are 4-Colorable

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In this talk, we show that every  $(2P_2, K_4)$ -free graph is 4-colorable. The bound is attained by the five-wheel and the complement of the seven-cycle. This answers an open question by Wagon [?] in the 1980s. Our result can also be viewed as a result in the study of the Vizing bound for graph classes. A major open problem in the study of computational complexity of graph coloring is whether coloring can be solved in polynomial time for  $(4P_1, C_4)$ -free graphs. Lozin and Malyshev [?] conjecture that the answer is yes. As an application of our main result, we provide the first positive evidence to the conjecture by giving a 2-approximation algorithm for coloring  $(4P_1, C_4)$ -free graphs.