

VCU Discrete Mathematics Seminar

Strengthening the Murty-Simon Conjecture on diameter-2-critical graphs

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Wednesday, Oct. 6
4145 Harris Hall, and Zoom
1:00-1:50

Zoom @ <https://vcu.zoom.us/j/92975799914>
password=graphs2357

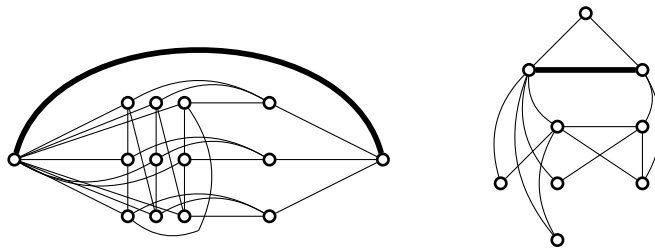


Figure 1: Two D2C graphs with a (bolded) dominating edge.

A graph is diameter-2-critical (D2C) if it has diameter 2 and the deletion of any edge increases its diameter. Several well-known graphs are D2C, such as the complete bipartite graphs or the Petersen Graph.

In the 1970s, Murty, Simon, Ore and Plesník independently conjectured that a D2C graph of order n has at most $\lfloor \frac{n^2}{4} \rfloor$ edges, with equality if and only if it is a balanced complete bipartite graph. This Conjecture was proved in 1992 by Füredi for D2C graphs of very large order.

With Florent Foucaud and Adriana Hansberg, we worked on a strengthening of this conjecture and proved an improved bound of $\lfloor \frac{n^2}{4} \rfloor - 2$ for D2C graphs with a dominating edge, a family for which the validity of the Murty-Simon Conjecture took three papers (published from 2003 to 2012) to prove.

In this talk, I will give some history on D2C graphs and the Murty-Simon Conjecture, before showing the main ideas we used in the proof of our result.

For the DM seminar schedule, see:

<https://www.people.vcu.edu/~clarson/dms.html>