

VCU Discrete Mathematics Seminar

No three in a line in a directed graph

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1:00-1:50 EST

On Zoom! with 4145 Harris meeting option:

<https://vcu.zoom.us/j/81475528886>
password=graphs2357



The *general position problem* for graphs asks for the largest subsets $S \subseteq V(G)$ of a graph such that no three vertices of S lie on a common shortest path. This problem is receiving a lot of attention, with the latest survey paper listing 149 references.

In this talk we will examine this problem for directed graphs. This problem has many interesting features: for example, whilst the only graphs with general position number two are C_4 and the paths, it is difficult to characterise the digraphs with the same property.

We prove some bounds for the problem and properties of general position sets in digraphs, determine the complexity of the problem and find the value for some families of digraphs including Kautz and permutation digraphs, and some circulants and oriented trees. Finally, we examine the spectrum of general position numbers obtained from all the orientations of a fixed undirected graph; we conjecture that for $n \geq 3$, there are always orientations with different general position numbers. This simple-sounding statement is difficult to prove in full generality, but we show that it holds for comparability graphs, triangle-free subcubic graphs and d -regular graphs for $4 \leq d \leq 5$.

We close with lots of open problems!

For the DM seminar schedule, see:

<https://go.vcu.edu/discrete>