VCU Discrete Mathematics Seminar

Determinants of Graphs

Prof Craig Larson
(VCU)

Wednesday, Oct. 16
1:00-1:50 EDT

In person! in 4145 Harris Hall, and Zoom @
`https://vcu.zoom.us/j/92975799914`
`password=graphs2357`

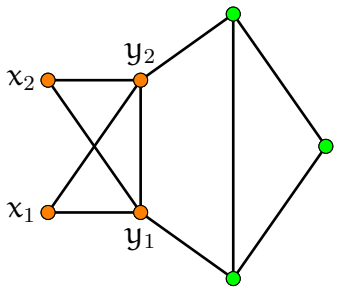

Figure 1: The vertices $I_c = \{x_1, x_2\}$ of G form a maximum cardinality critical independent set. The sets $X = I_c \cup N(I_c) = \{x_1, x_2, y_1, y_2\}$ (orange) and $\bar{X} = V \setminus X$ (green) induce a decomposition of the graph into a KE subgraph $G[X]$ and a 2-bicritical subgraph $G[\bar{X}]$. Here $\det(G[X]) = 0$, $\det(G[\bar{X}]) = 2$, and $\det(G) = 0$.

Graphs have determinants. Their theory includes Sachs' subgraphs and the Sachs' determinant formula. We apply this to get a new product formula:

Let G be a graph with maximum critical independent set I_c. If $X = I_c \cup N(I_c)$, and $\bar{X} = V(G) - X$, then

$$\det(G) = \det(G[X]) \cdot \det(G[\bar{X}]).$$

For the DM seminar schedule, see:

`https://go.vcu.edu/discrete`