MAD 5932/4934 Applied Graph Theory Summer 'C"

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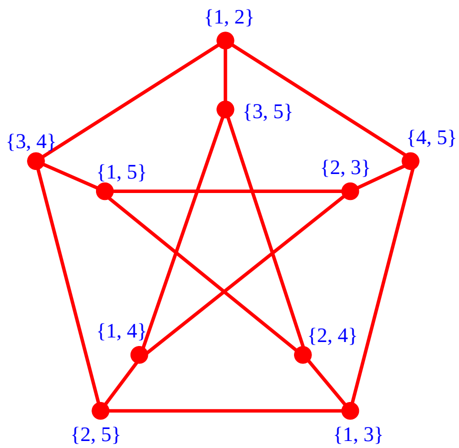
http://www.math.fsu.edu/∼bellenot/class/su15/graph
MTWRF 2:00-3:20 102 LOV



Petersen Graph -- {u, v} adjacent to {s, t} <=> the sets are disjoint

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

Adjacency Matrix

$$\begin{matrix} 3 & 1 & 1 & 1 & 1 & 1 & -2 & -2 & -2 & -2 \end{matrix}$$

$$\begin{bmatrix} 1 & 1 & 1 & 1 & 0 & 0 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & 0 \\ 1 & 1 & 0 & 0 & 1 & 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -1 \\ 1 & -1 & 0 & -1 & 0 & -1 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -1 \\ 1 & -1 & -1 & 0 & -1 & 0 & \frac{1}{2} & \frac{1}{2} & -\frac{3}{2} & -1 \\ 1 & -1 & -1 & -1 & -1 & -1 & -1 & 0 & 1 & 1 \\ 1 & 0 & 0 & 0 & 0 & 1 & 0 & -1 & 1 & 1 \\ 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \end{bmatrix}$$

The Eigenvectors (the column vectors) and Eigenvalues of the Adjacency Matrix.

Unlike the more theoretical brother MAD5305, MAD5932 Applied Graph Theory is designed more towards using than proving. Here Matlab eigenanalysis of the adjacency matrix is used to determine graph properties. For example, the largest eigenvalue/eigenvector says this graph is 3-regular. Often different graphs have different eigenvalues which will imply they are not isomorphic. Chemists use this feature.