

MATH 482: HOMEWORK 9

- (1) Find the eigenvalues of the adjacency matrix and Laplacian matrix of C_5 .

Hint: There are only three distinct eigenvalues, and two of them have multiplicity two. Use the matrix tree theorem and the formula for the trace of a matrix. If you know what the number **5** is all about, you will not be surprised by your answer.

- (2) Find the eigenvalues of the adjacency matrix and Laplacian matrix of C_6 .

Hint: They are all integers. Use the matrix tree theorem.

- (3) Find the edge expansion constant $h(K_n)$ for $n \geq 3$. Compare this to the spectral gap of K_n .

- (4) (20 points) Find the edge expansion constant $h(K_{n,n})$ for $n \geq 1$. Compare this to the spectral gap of $K_{n,n}$.