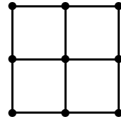


L165100 - Fall 2010 - Homework 1

1. Prove that the distance between any two vertices of a connected graph G (that is, the length of a shortest walk between these vertices) is less than the number of distinct eigenvalues of G .
2. Find the eigenvalues of the complete bipartite graph $K_{m,n}$ in two different ways: by linear algebra and by counting closed walks.
3. Find the number of closed walks of length ℓ in the graph below.



4. Show that a finite poset can be covered by k antichains if and only if it does not contain a $(k + 1)$ -element chain.
5. How many antichains of maximal size are there in the Boolean poset \mathcal{B}_n ?