MA859: SELECTED TOPICS IN GRAPH THEORY

ASSIGNMENT 3

1. Give an example of a graph G for which $\chi(G) = 1 + \Delta(G)$.

2. Prove or disprove: Orthogonal equivalence among $n \times n$ is an equivalence relation.

3. Let G be a simple graph with vertex labeling $V(G) = \{u_1, u_2, ..., u_n\}$. Let k be a natural number greater than zero. Prove that the entry $a_{ij}^{(}k)$ in $A^k(G)$ is the number of distinct walks from u_i to u_j of length k in G.

4. Write an algorithm to construct a graph G for which $\kappa(G) = a$, $\lambda(G) = b$ and $\delta(G) = c$, where a, b and c are integers such that $0 < a \leq b \leq c$.