

Graph Theory

Assignment 2

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Problem 9. Show that the characterizations D,E, and F for trees are correct. For this argue that any or all of A, B, and C imply D, E, and F and are implied by D, E, and F. **(2 Points)**

Problem 10. Find 4 classes of graphs which are Eulerian. By a class of graphs we mean a set $\mathcal{G} = \{G_1, G_2, \dots\}$ so that \mathcal{G} contains one graph for every natural number. For example the class $P = \{P_1, P_2, P_3, \dots\}$ is the class of graphs where the n th graph is a path on n vertices. Try to find classes with as few number of edges as possible. **(1 Points)**

Problem 11. Describe an $O(E)$ -time algorithm to find an Euler tour of G if one exists **(4 Points)**

Problem 12. Use Matrix Tree theorem to find a matrix whose determinant is $\tau(K_{m,n})$. Compute $\tau(K_{m,n})$. **(3 Points)**

Problem 13. Let G_n be the graph on $2n$ vertices and $3n - 2$ edges pictured below, for $n \geq 1$. Determine $\tau(G_n)$. **(4 Points)**

