MTH 4140 Graph Theory

Yaohui Wu

April 24, 2024

Homework 3

Introduction to Graph Theory

Chapter 2 Trees and Distances

Section 2.2 Spanning Trees and Enumeration

Problem 1. Exercise 2.2.1

Solution. (a) The trees with Prüfer codes that has only one value are the stars. (b) The trees with Prüfer codes that has exactly two values are the double stars. (c) The trees with Prüfer codes that have distinct values in all positions are the paths. ∎

Section 2.3 Optimization and Trees

Problem 2. Exercise 2.3.8

Solution. We run Kruskal's algorithm to get a minimum spanning tree (MST) of the graph built from the given adjacency matrix. The total weight of the MST is

$$3 + 3 + 7 + 8 = 21$$

The least cost of making all the cities reachable from each other is 21. ∎

Chapter 3 Matchings and Factors

Section 3.1 Matchings and Covers