Part III–Selected Applications

Part III surveys optimization problems that involve one decision-maker.

Chapter 7. A Survey of Optimization Problems

This chapter is built upon 10 examples. When taken together, these examples suggest the range of uses of linear programs and their generalizations. These examples include linear programs, integer programs, and nonlinear programs. They illustrate the role of optimization in operations management and in economic analysis. Uncertainty plays a key role in several of them. Also discussed in this chapter are the ways in which Solver and Premium Solver can be used to solve problems that are not linear.

Chapter 8. Path-Length Problems and Dynamic Programming

This chapter is focused on the problem of finding the shortest or longest path from one node to another in a directed network. Several methods for doing so are presented. Linear programming is one of these methods. Path-length problems are the ideal setting in which to introduce "dynamic programming," which is a collection of ideas that facilitate the analysis of decision problems that unfold over time.

Chapter 9. Flows in Networks

Described in this chapter are "network flow" models and the uses to which they can be put. If the "fixed" flows such a model are integer-valued, the simplex method is shown to find an integer-valued optimal solution.