

## 13 Multivariable Process Control

Up to this point in our study of automatic process control, we have considered only processes with a **single control objective** or controlled variable. Often, however, we encounter processes in which more than one variable must be controlled—that is, multiple control objectives. In such processes, we can still consider each control objective separately from the others as long as they do not interact with each other. In this chapter, we will study and design control systems for processes in which the various control objectives interact with each other. We refer to these systems as multivariable control systems or as multiple-input, multiple-output (MIMO) control systems. The problem we will be addressing is that of loop interaction. We will find that the response and stability of the multivariable system can be quite different from those of its constituent loops taken separately. We will learn how to pair the controlled and manipulated variables to minimize the effect of interaction and how to design decouplers that reduce or eliminate the effect of interaction.