

# PID Controller Tuning for Dynamic Performance

## CHAPTER

# 9

### 9.1 ■ INTRODUCTION

As demonstrated in the previous chapter, the proportional-integral-derivative (PID) control algorithm has features that make it appropriate for use in feedback control. Its three adjustable tuning constants enable the engineer, through judicious selection of their values, to tailor the algorithm to a wide range of process applications. Previous examples showed that good control performance can be achieved with a proper choice of tuning constant values, but poor performance and even instability can result from a poor choice of values. Many methods can be used to determine the tuning constant values. In this chapter a method is presented that is based on the time-domain performance of the control system. Controller tuning methods based on dynamic performance have been used for many decades (e.g., Lopez et al., 1969; Fertik, 1975; Zumwalt, 1981), and the method presented here builds on these previous studies and has the following features:

1. It clearly defines and applies important performance issues that must be considered in controller tuning.
2. It provides easy-to-use correlations that are applicable to many controller tuning cases.
3. It provides a general calculation approach applicable to nearly any control tuning problem, which is important when the general correlations are not applicable.