

<<现代控制系统>>

图书基本信息

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## <<现代控制系统>>

### 内容概要

《现代控制系统(第12版英文版)》由多尔夫、毕晓普所著,控制系统原理及相近课程是高等学校工科学生的核心课程之一。

《现代控制系统(第12版英文版)》一直是该类课程畅销全球的教材范本。

主要内容包括控制系统导论、系统数学模型、状态空间模型、反馈控制系统的特性、反馈控制系统的性能、反馈系统的稳定性、根轨迹法、频率响应方法、频域稳定性、反馈控制系统设计、状态变量反馈系统设计、鲁棒控制系统和数字控制系统等。

本书的例子和习题大多取材于现代科技领域中的实际问题,新颖而恰当。

学习和解决这些问题,可以使学生的创造性精神得到潜移默化的提升。

本书可作为高等学校工科(自动化、航空航天、电力、机械、化工等)

本科高年级学生和研究生的双语教学教材,也可供从事相关工作的人员作为参考用书使用。

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## 章节摘录

版权页：插图： A fluid flow system is shown in Figure 2.38. The reservoir (or tank) contains water that evacuates through an output port. Water is fed to the reservoir through a pipe controlled by an input valve. The variables of interest are the fluid velocity  $V$  (m/s), fluid height in the reservoir  $H$  (m), and pressure  $p$  (N/m<sup>2</sup>). The pressure is defined as the force per unit area exerted by the fluid on a surface immersed (and at rest with respect to) the fluid. Fluid pressure acts normal to the surface. For further reading on fluid flow modeling. The elements of the control system design process emphasized in this example are shown in Figure 2.39. The strategy is to establish the system configuration and then obtain the appropriate mathematical models describing the fluid flow reservoir from an input-output perspective. The general equations of motion and energy describing fluid flow are quite complicated. The governing equations are coupled nonlinear partial differential equations. We must make some selective assumptions that reduce the complexity of the mathematical model. Although the control engineer is not required to be a fluid dynamicist, and a deep understanding of fluid dynamics is not necessarily acquired during the control system design process, it makes good engineering sense to gain at least a rudimentary understanding of the important simplifying assumptions. For a more complete discussion of fluid motion. To obtain a realistic, yet tractable, mathematical model for the fluid flow reservoir, we first make several key assumptions. We assume that the water in the tank is incompressible and that the flow is inviscid, irrotational and steady. An incompressible fluid has a constant density  $\rho$  (kg/m<sup>3</sup>). In fact, all fluids are compressible to some extent. The compressibility factor,  $k$ , is a measure of the compressibility of a fluid. A smaller value of  $k$  indicates less compressibility.



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