

<<过程控制仪表技术>>

图书基本信息

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## &lt;&lt;过程控制仪表技术&gt;&gt;

## 前言

由Curtis D. Johnson教授（University of Houston）编著的《过程控制仪表技术》一书自出版以来受到广泛的欢迎，目前该书已出到第8版，其中添加了许多自动化领域新技术发展的内容，实现了与最新科技发展同步的目标。

全书共分为两部分，第一部分为前6章，作者从人们对生产设备手动操作的实际经验出发，系统地介绍了控制原理、控制设备和控制系统的基本概念。

在测量信号的变换和处理方面，把工业仪表中的模拟电路、可编程控制器（PLC）及信号采集系统中的数字电路结合工业电子学中的基本理论融会贯通加以介绍。

在测量信号的获取方面，重点对温度、机械量和光学传感器的原理、器件、特性和应用进行了详细的分析。

书中第二部分为后6章，首先讲述了控制信号的类型和执行器，接着重点介绍了离散、连续、计算机及总线网络控制系统的构成、特点和技术指标。

结合系统的要求，讲解了PLC的原理和编程方法，位式控制、PID概念及模拟调节器，工业控制计算机硬件、软件的配置等内容。

最后介绍了串级和多变量控制系统以及系统的调节质量评定和调节参数的整定方法。

尽管涉及工业测量和调节控制内容的同类教材很多，但这本书有它自己的特点：（1）测量技术和控制技术相结合。

把工业电子学的知识和工业仪表中的模拟电路、信号采集系统中的数字电路相结合；把被控系统的特性和调节器的功能相结合。

这样就为控制系统中的装置与系统、理论与实际相结合打下了基础，克服了目前我国自动化专业教育中理论、系统、装置、应用互相分割的状况。

（2）例题习题非常丰富。

书中每章结束都有习题，而且在每个章节中还附有大量的例题。

这些例题和习题都是围绕核心概念，结合实际应用的典型问题，通过解题可以使读者加深对基础理论的理解，学会设计和调试的方法，扩展应用的思路。

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### 内容概要

《过程控制仪表技术（第8版）》共分为两部分，第一部分为前6章，作者从人们对生产设备手动操作的实际经验出发，系统地介绍了控制原理、控制设备和控制系统的基本概念。在测量信号的变换和处理方面，把工业仪表中的模拟电路、可编程控制器（PLC）及信号采集系统中的数字电路结合工业电子学中的基本理论融会贯通加以介绍。在测量信号的获取方面，重点对温度、机械量和光学传感器的原理、器件、特性和应用进行了详细的分析。

书中第二部分为后6章，首先讲述了控制信号的类型和执行器，接着重点介绍了离散、连续、计算机及总线网络控制系统的构成、特点和技术指标。结合系统的要求，讲解了PLC的原理和编程方法，位式控制、PID概念及模拟调节器，工业控制计算机硬件、软件的配置等内容。最后介绍了串级和多变量控制系统以及系统的调节质量评定和调节参数的整定方法。

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## 章节摘录

插图：1.3.1 Identification of Elements The elements of a process-control system are defined in terms of separate functional parts of the system. The following paragraphs define the basic elements of a process-control system and relate them to the example presented in Section 1.2. Process In the previous example, the flow of liquid in and out of the tank, the tank itself, and the liquid all constitute a process to be placed under control with respect to the fluid level. In general, a process can consist of a complex assembly of phenomena that relate to some manufacturing sequence. Many variables may be involved in such a process, and it may be desirable to control all these variables at the same time. There are single-variable processes, in which only one variable is to be controlled, as well as multivariable processes, in which many variables, perhaps interrelated, may require regulation. The process is often also called the plant. Measurement Clearly, to effect control of a variable in a process, we must have information about the variable itself. Such information is found by measuring the variable. In general, a measurement refers to the conversion of the variable into some corresponding analog of the variable, such as a pneumatic pressure, an electrical voltage or current, or a digitally encoded signal. A sensor is a device that performs the initial measurement and energy conversion of a variable into analogous digital, electrical, or pneumatic information. Further transformation or signal conditioning may be required to complete the measurement function. The result of the measurement is a representation of the variable value in some form required by the other elements in the process-control operation. In the system shown in Figure 1.3, the controlled variable is the level of liquid in the tank. The measurement is performed by some sensor, which provides a signal,  $s$ , to the controller. In the case of Figure 1.2, the sensor is the sight tube showing the level to the human operator as an actual level in the tank.

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### 编辑推荐

《过程控制仪表技术(第8版)》特色：《过程控制仪表技术(第8版)》从第1版（1977年）至第8版，历时三十余载，受到广泛欢迎。

《过程控制仪表技术(第8版)》具有明显特色：测量技术和控制技术相结合。

把工业电子学的知识和工业仪表中的模拟电路、信号采集系统中的数字电路相结合；把被控系统的特性和调节器的功能相结合。

这样就为控制系统中的装置与系统、理论与实际相结合打下了基础。

内容紧密联系实际，书中有很多实际控制系统和仪表装置的设计范例及典型方法，可供读者在实际工程中应用。

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