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LabVIEW based Advanced Instrumentation Systems

With 488 Figures and 34 Tables

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Contents

1

Introduction to Virtual Instrumentation

Learning Objectives. On completion of this chapter the reader will have a knowledge on:

- History of Instrumentation Systems
- Evolution of Virtual Instrumentation
- Premature Challenges of VI
- Definition of Virtual Instrumentation
- Architecture of Virtual Instrumentation
- Programming Requirements of VI
- Conventional Virtual Instrumentation
- Distributed Virtual Instrumentation
- Virtual Instruments Versus Traditional Instruments
- Advantages of VI
- Evolution of LabVIEW
- Creating Virtual Instruments using LabVIEW
- Advantages of LabVIEW
- Virtual Instrumentation in the Engineering Process
- Virtual Instruments Beyond the Personal Computer

1.1 Introduction

An instrument is a device designed to collect data from an environment, or from a unit under test, and to display information to a user based on the collected data. Such an instrument may employ a transducer to sense changes in a physical parameter, such as temperature or pressure, and to convert the sensed information into electrical signals, such as voltage or frequency variations. The term instrument may also be defined as a physical software device that performs an analysis on data acquired from another instrument and then outputs the processed data to display or recording devices. This second category of recording instruments may include oscilloscopes, spectrum analyzers, and digital millimeters. The types of source data collected and analyzed by instruments may thus vary widely, including both physical parameters such as