

VIRTUAL INSTRUMENTATION FOR A MINI PLANT GROWTH CHAMBER

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ABSTRACT

In today's rapid development of technology, computer plays an important role in instrumentations including automation, process control, measurement and testing. One of the major developments resulting from the adoption of computer is the concept of virtual instrumentation.

Virtual instrumentation is the software representation of traditional and new measurement instruments on a personal computer. With virtual instrumentation software, a custom instrument can be constructed. The virtual instrument will have the controls and displays that we want to see and use. It will accept the ranges we choose and will analyze measurement data in the manner we prescribe.

This reports presents a user defined measurement system called virtual instrument. It is designed to display the output data of a mini plant growth chamber and to analyze the data. Controller is used to automate the final control element. The virtual instrumentation is written using Visual Basic 6.0. A set of real historical data was used to represents the output from a plant growth chamber. The work carried out here shows that virtual instrumentation can replace the real instrument.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Photosynthesis is an important biochemical process in which plants, algae and bacteria harness the energy of sunlight to produce food. All living things depend on the energy produced by the photosynthesis for their nourishment. It is also responsible for producing the oxygen that makes up a large portion of Earth's atmosphere. There are several components that are needed by a plant to grow. The components are water, air or gaseous, nutrient, temperature, light and room to grow. The basic process in growing plant is photosynthesis. Photosynthesis is the chemical process by which chlorophyll-containing plants use light to convert carbon dioxide and water into carbohydrate, releasing oxygen as a by-product [1]. Three components of plant growth will be used in this project is the temperature, relative humidity and light intensity.

Automation will be applied in the system to automate the final control elements. Automation is the use of control systems to control industrial machinery and processes replacing human operators [2]. Here, the final control elements used are fan, water spray and bulb. Fan is used to reduce the temperature once the temperature is increase at a certain set point. Water valve is used to maintain the relative humidity in the chamber. The light intensity in the chamber is actuated by using bulb. ON-OFF controller will be used as the controller.

In applying the ON-OFF controller, error is calculated as the calculation will decide the controller action; either it is ON or OFF. ON-OFF controller was chose since the photosynthesis is a slow process. Therefore, simple controller like ON-OFF controller is enough for the system.