DEVELOPMENT OF VIRTUAL pH ANALYZER WITH PID GAIN SCHEDULING CONTROL METHOD

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ABSTRACT

This paper presents the development of virtual pH analyzer that equipped with PID Gain Scheduling control method. This project is implemented using LabVIEW and the functionality of the instrument is tested. In this study, the PID Gain Scheduling was tested using ITAE tuning method. The functionality of virtual pH analyzer was evaluated in term of percentage overshoot (%OS). The outcome of the project is the flexible instrument that replaces the traditional instrument for pH measurement and control.

Keywords

pH Analyzer; LabVIEW; PID Gain Scheduling; ITAE

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The rapidly developed in the instrumentation field such as sensing, hardware and software technologies known as virtual instrument [1] give a new scenario to create flexible and sophisticated instruments for various applications. From literature [3], the virtual instruments are defined as the software-oriented instrument that utilize the computing power, display and connectivity capabilities of modern computers applications for measurement and control [2]. It replaces part of signal acquisition, processing and display, in traditional instruments, by using personal computer. Then, the computer monitor can be turned into the front panel of the traditional instruments by graphical programming with enhanced features.

In the past, the measurement of pH involves the use of multiple instruments such as pH electrode, pH meter connected to a strip chart recorder and some other data acquisition devices. Figure 1.1 shows the conventional pH meter setup. The conventional pH meters were solely indicator instrument, no pH control system element and unable to modify with new processing method. In some cases, most of the time a sensor failure would result in a false an indication