K S Institute of Technology, Bangalore
Department of Electronics and Communication Engineering

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Presentation of Internship Work

On

Industrial Instrument and laboratory instrument Using LAB VIEW

By

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Carried at

VI SOLUTIONS

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Presentation Outline

- About Company
- Introduction slide
- Methodology
- Tests and Results
- Conclusion
- Queries

About Company

- VI Solutions is an automation Company and a pioneer in providing Systems, Solutions and Products for a wide range of industries and applications.
- Specialized in the design and realization of turnkey machines and tools.
- Expertise in automated assembly lines, process automation, data acquisition and visual inspection.
- Leading companies in building Advanced Communication Systems, Real Time Embedded Systems and other Industrial Automation services.

OBJECTIVES

- To construct a simple virtual instrument (VI) using LAB view software
- To create transfer function of given data
- To virtually create PID controller

INTRODUCTION

- Lab VIEW (Laboratory Virtual Instrument Engineering Workbench)
- Lab VIEW is more flexible than standard laboratory instrument because it is software based.
- Lab VIEW is a powerful and versatile analysis and instrumentation software system for measurement and automation.
- It's graphical programming language called G programming is performed using a graphical block diagram that compiles into machine code and eliminates a lot of the syntactical details.
- LabVIEW can communicate with hardware such as data acquisition, vision, and motion control devices, and GPIB, PXI, VXI, RS-232, and RS-485 devices

INTRODUCTION CONTD

- A PID controller is an instrument used in industrial control applications to regulate temperature, flow, pressure, speed and other process variables.
- The term PID stands for proportional integral derivative.
- It is used to minimize the steady state error and increase the system stability.
- Out put of PID controller is proportional to proportional , integral , derivative controller.

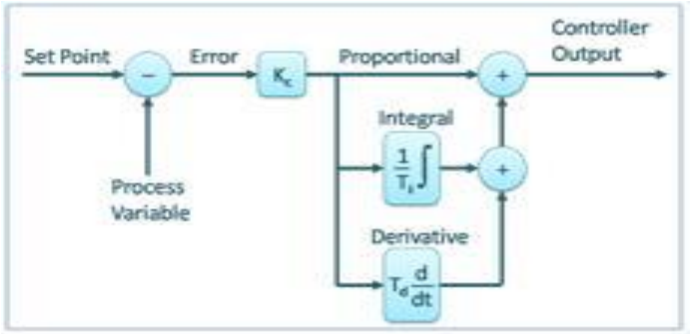


Fig 1 Block diagram of PID controller

INTRODUCTION CONTD

- The transfer function of a control system is defined as the ratio of the Laplace transform of the output variable to Laplace transform of the input variable assuming all initial conditions to be zero.

$$G(s) = \frac{C(s)}{R(s)}$$

METHODOLOGY

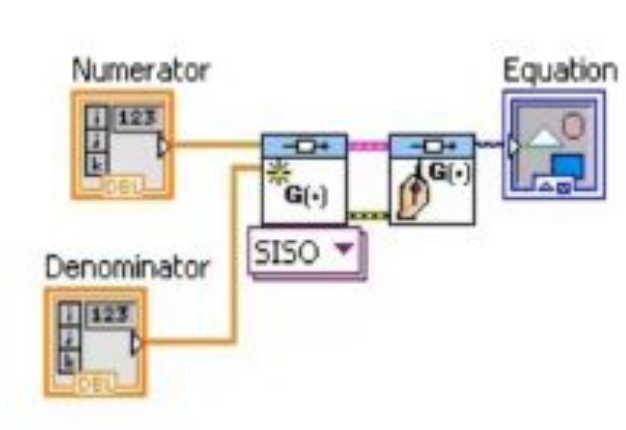


fig 2 Block diagram of transfer function model in Lab VIEW

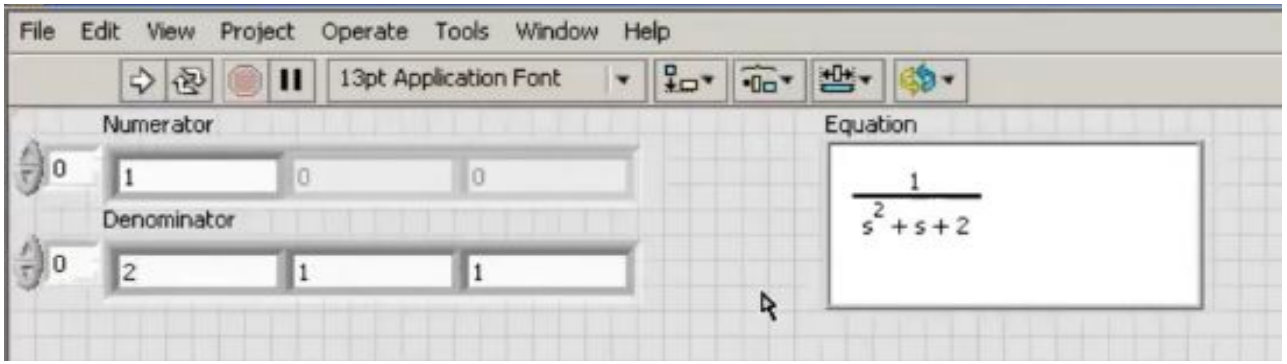


fig 3 The out put of transfer function from lab VIEW software

METHODOLOGY CONTD

PID controller

$$OP = OP_{bias} + \underbrace{K_c e(t)}_{\text{Proportional}} + \underbrace{\frac{K_c}{\tau_I}\int e(t)dt}_{\text{Integral}} + \underbrace{K_c \tau_D \frac{de(t)}{dt}}_{\text{Derivative}}$$

$$G_{pid} = K_p + \frac{K_i}{s} + K_d s = \frac{K_d s^2 + K_p s + K_i}{s}$$

METHODOLOGY CONTD

- The transfer function of PID controller is given as

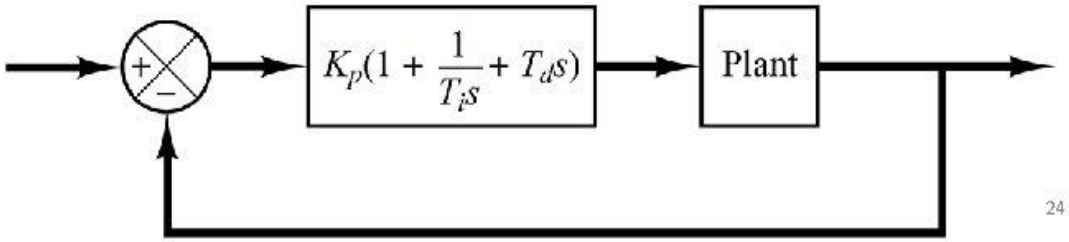
$$\frac{C_{pid}(s)}{E(s)} = K_p + K_i\frac{1}{s} + K_d\, s$$

- It can be simplified as

$$\frac{C_{pid(s)}}{E(s)} = K_p(1 + \frac{1}{T_i s} + T_d\, s)$$

- Where

$$T_i = \frac{K_p}{K_i} \qquad T_d = \frac{K_d}{K_p}$$



METHODOLOGY CONTD

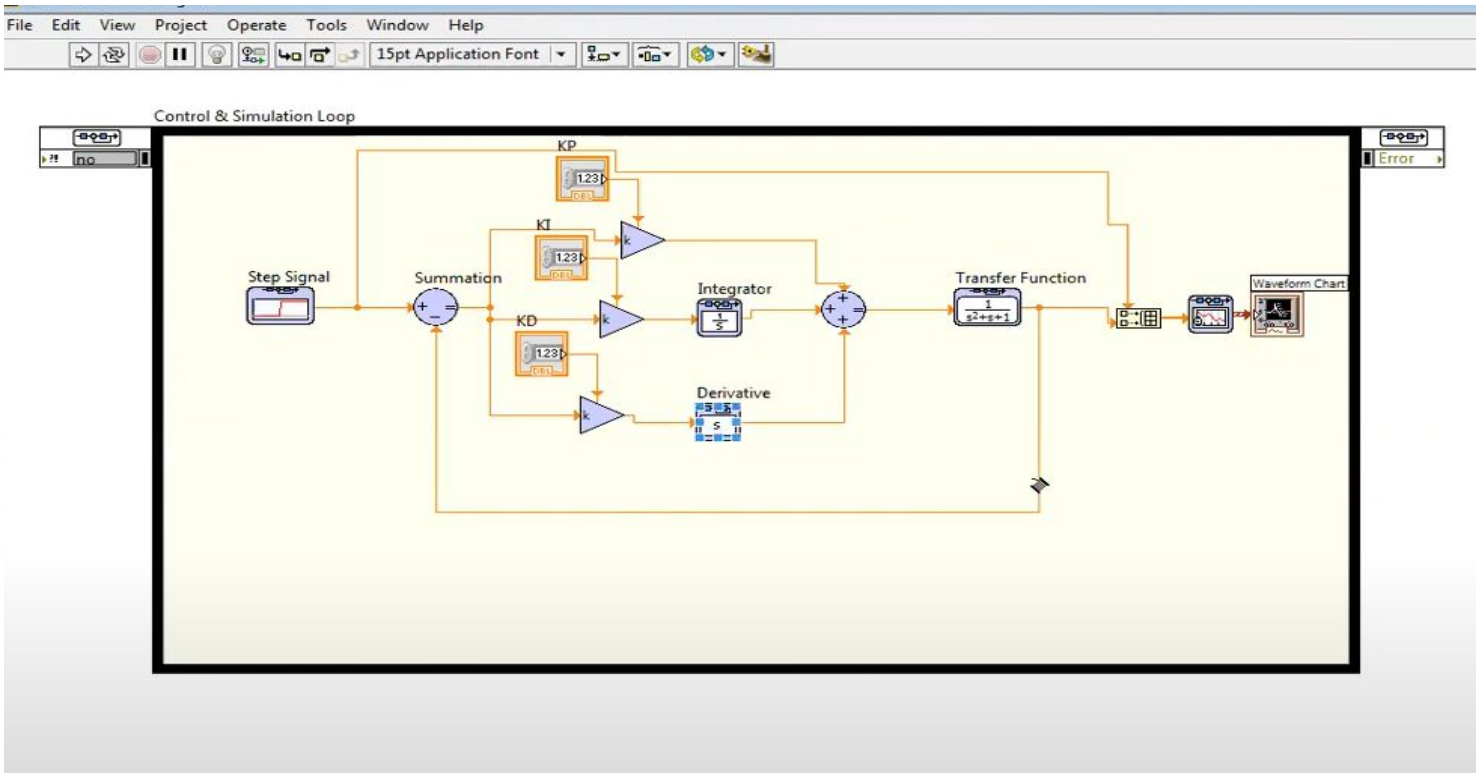


Fig 4 Block diagram of PID controller in LAB VIEW

RESULT

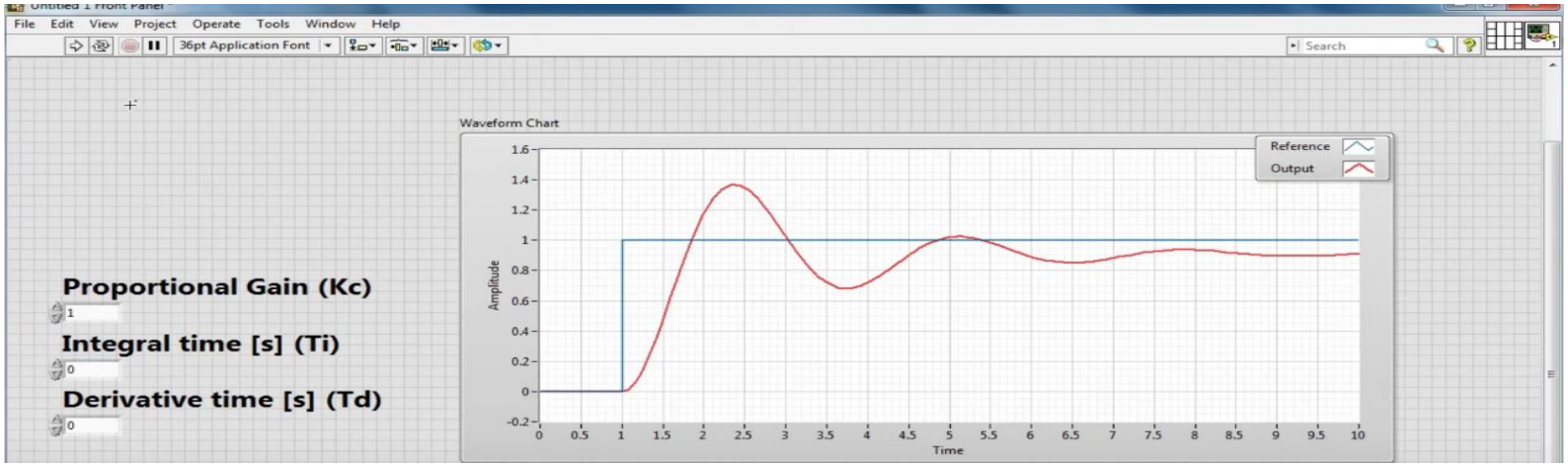


Fig 5 output waveform when kc=1

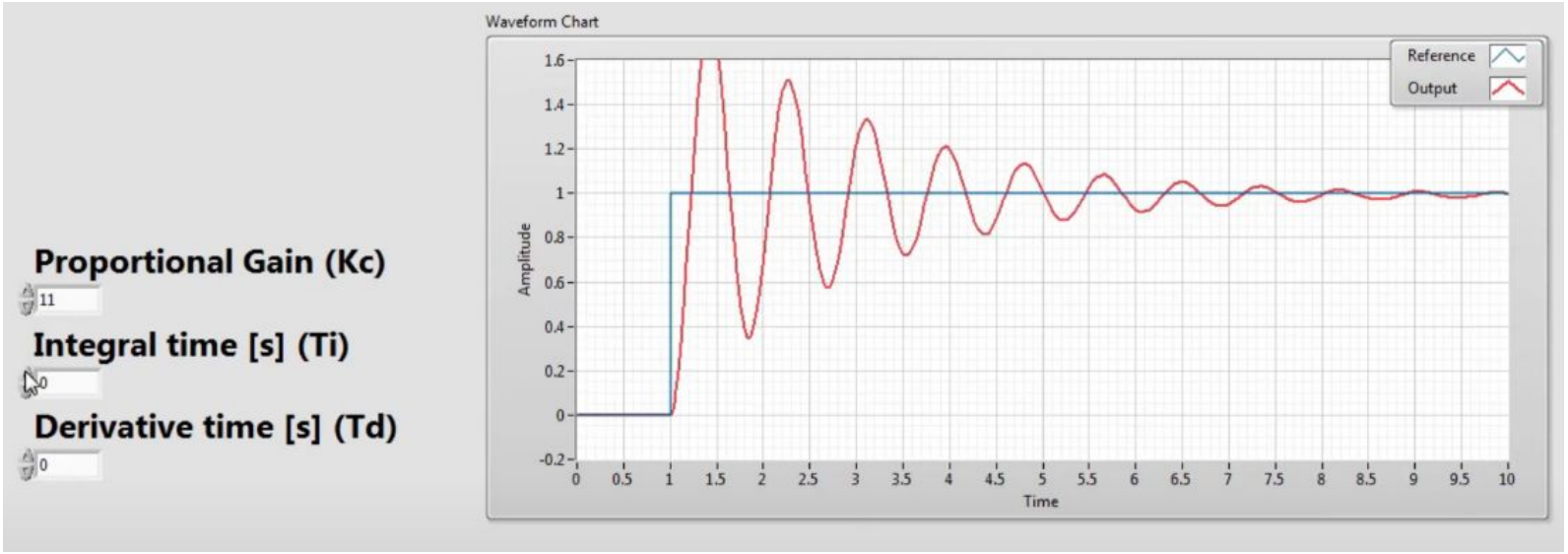


Fig 6 output wave form when kc = 11

RESULT CONTD

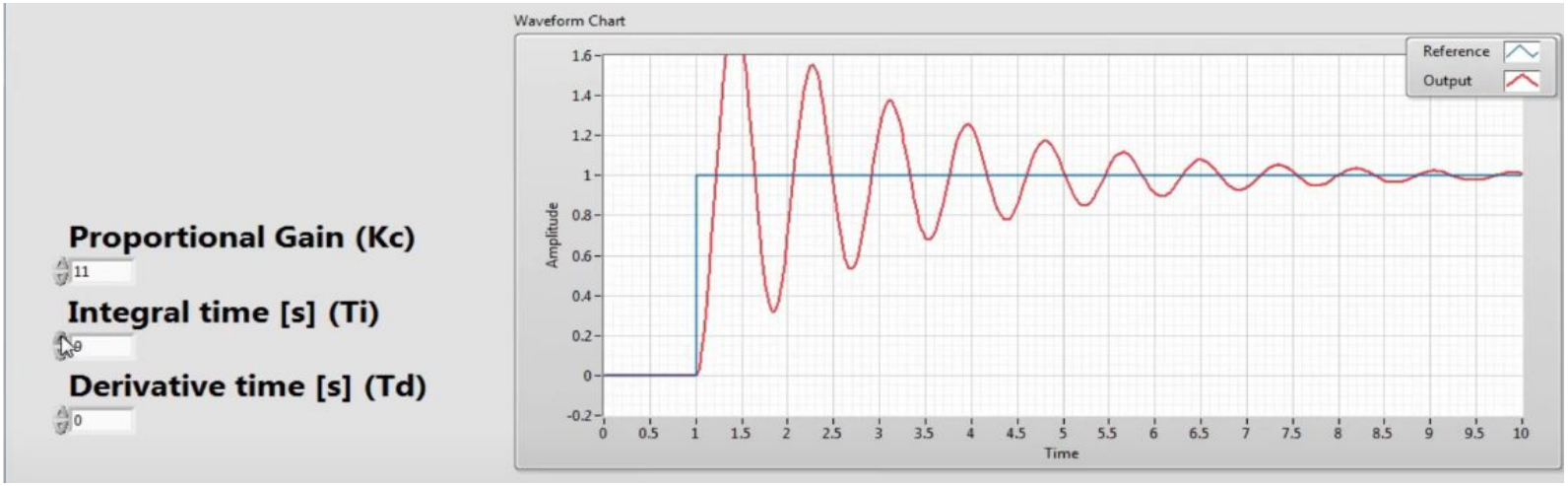


Fig 7 o/p waveform Ti = 9

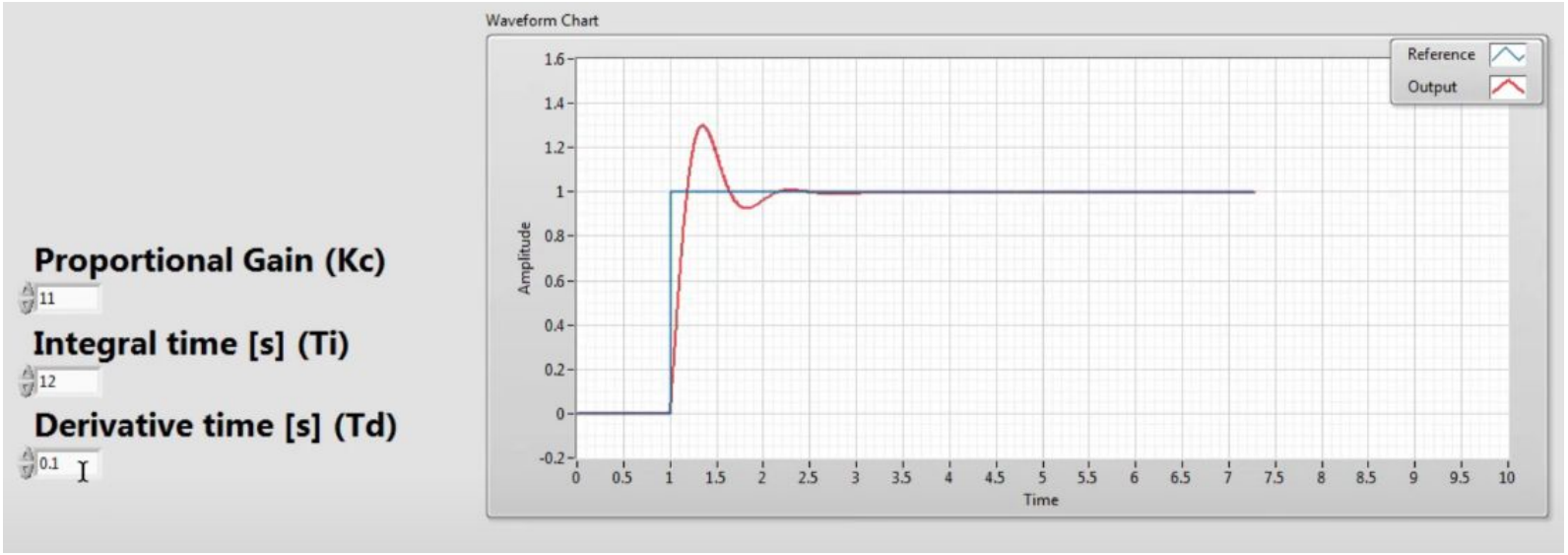


Fig 8 o/p waveform Td=0.1

RESULT CONTD

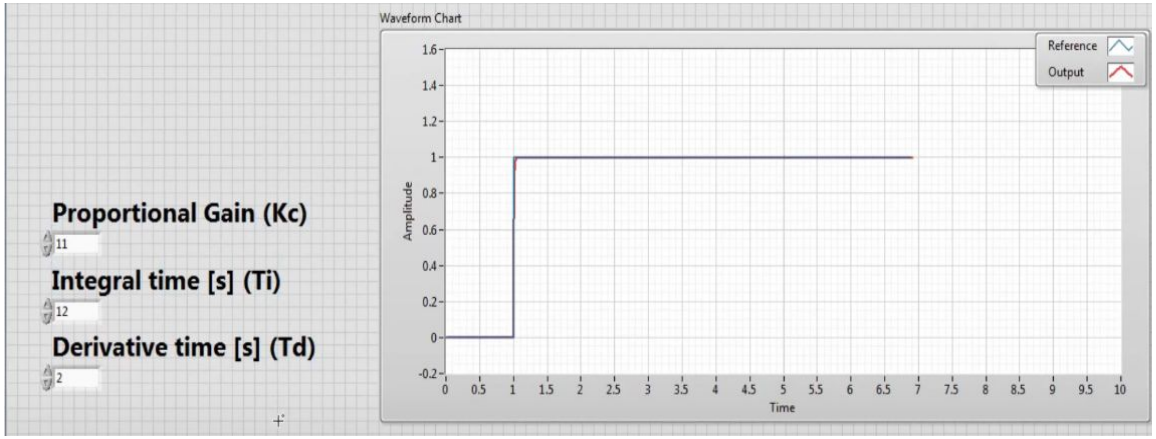


Fig 8 final o/p

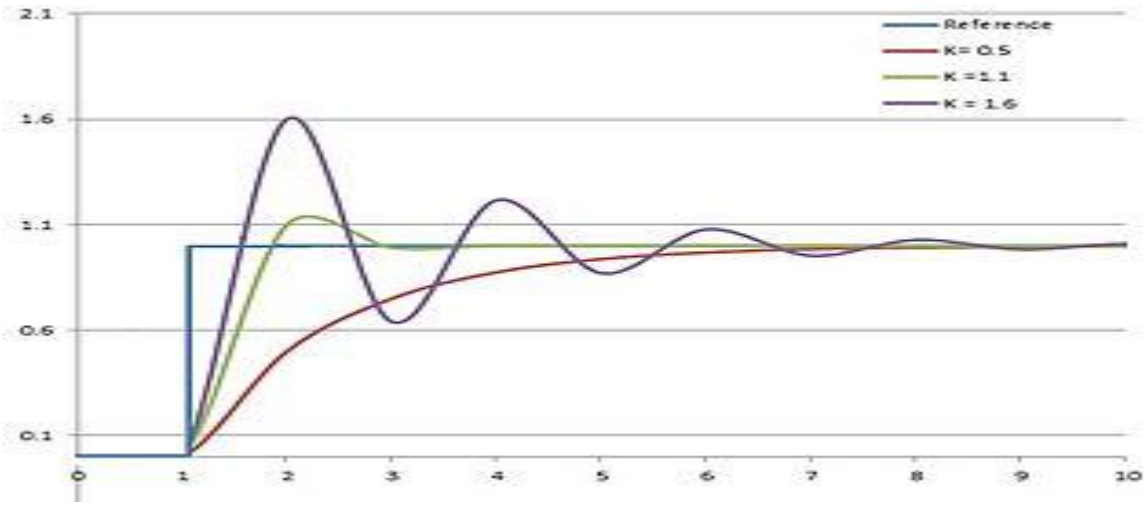


Fig 9 combined o/p waveform

Conclusion and Future Enhancement

- PID controller is used to reduce steady state error in an control system
- PID controller increases the stability
- PID controller is cheap and easy to implement
- Measurement data visualization and Graphs are super straightforward in Lab VIEW.
- Ease of interfacing with instrumentation

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[5] Guneet Kour, Jaswanti, LabVIEW Based Alarm Systems In Home, ISSN 2250-0987 Jaswanti et al, UNIASCIT, Vol 2, Issue-3, pp.305-307, 2012

QUERIES ?

THANK YOU