

# **Chapter 1**

## **Introduction**

### **1.1 Background**

This project basically is about designing PID controller using LabView 8.5 to control a DC motor speed. PID stands for proportional-integration-derivative.

The chosen of PID controller is because it is the simplest controller available. It used three element; proportional part, integration part and derivative part. Easy to say, this controller is basically an element of mathematical expression. In simple language, the controller will collect the data from the output of the applications or it is called feedback. Then, it will compare the feedback with the setpoint (setpoint is a value of a user set initially or desired output user want). If there is different between the two of them, even it is merely slightest, the PID controller will try to reduce the error as best as possible to zero. Because there are no perfect controller invented yet, thus to reduce the error completely is impossible.

The motor model is Clifton Percission. There are two things of this motor that can be controlled; speed and angular movement. This project as it state before is about controlling the speed. For example, if 12 volts is appointed to the motor, and it is common sense the output is also 12 volts. However it doesn't go that way. The output maybe less, let say 10 volts. The different 2 volts is what is called error. This error is sends or feedback to the summing point (some of the part in PID). Then, the PID will do its job.

Before discuss further about the job that the PID done, it is time to explain about the software needed to develop the PID controller. LabVIEW version 8.5 is chosen. This software, developed by National Instrument is a platform and development environment for a visual programming language. The graphical language is named "G". This programming software used graphical method rather than coding or whatever language. This made this software is more understandable to use.

The purpose to design this project is to overcome the problem in industry like to avoid machines damages and to avoid slow rise time and high overshoot. This is because when the starting voltage is high, it is not suitable for machine and can make machine damages. So, a controller likes PID is developed to overcome this problem.

## 1.2 Problem Statement

There are problems when trying to run any application or plant such as to run DC motor speed, water tank level or others. The problems are or known better as error; lag of efficiency, loss in terms of speed, rpm or anything regards to the output of that applications. Thus, in order to eliminate or reduce these errors, certain controller must be constructed. This controller will try to minimize the error to get the best output possible.

Application or plant likes machines are tending to damage without implementation of control methodology in it system. It is known that the characteristic of control system is specified in term of transient response. The transient response of a practical control system usually exhibits damped oscillation before reaching steady state. As for machines, having a high overshoot is an undesired condition since the starting current is very high. Thus, control methodology such as PID controller is used to limit the maximum overshoot as well as to reduce the starting current of the machine. Therefore, the power used can be reduced as well as avoid machine from damaged due to bad system performance.

A DC motor can be control by computer (any software available) even without applying the controller. However, it is ineffective and inefficient because of the slow response system as the desired output is hardly to achieve. So, PID controller is implemented as a control system to obtain precise numerical information input, and yet capable of highly adaptive control.