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Approaches for tuning of PID Controller

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Abstract: Controlling the process is the main issue that rises in the process industry. It is very important to keep the process working probably and safely in the industry, for environmental issues and for the quality of the product being processed. PID control is a control strategy that has been successfully used over many years. Simplicity, robustness, a wide range of applicability and near optimal performance are some of the reasons that have made PID control so popular in the academic and industry sectors. Recently, it has been noticed that PID controllers are often poorly tuned and some efforts have been made to systematically resolve this matter. In the paper a brief summary of PID theory is given, then, some of the most used PID tuning methods are discussed.

Keywords: Proportional (P), Integral (I), Derivative (D), controller, control system.

INTRODUCTION

The theory of control deals with the methods, which leads to the change of behavior of controlled dynamic system. The desired output of a system is called the reference or set point. When one or more outputs of the system need to follow a certain reference over time then a controller modifies the inputs of system to obtain the desired value on the output of the system as shown in Fig. 1.

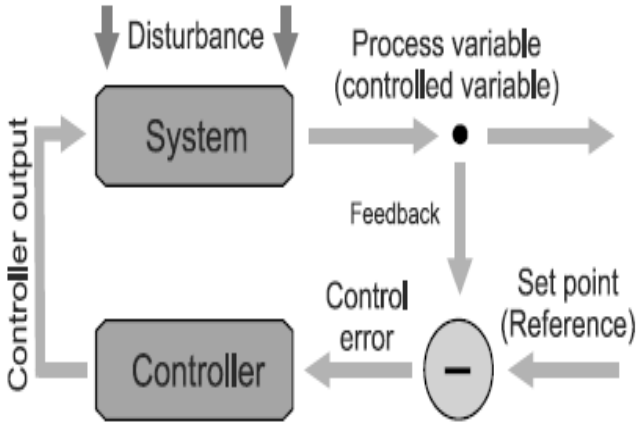

Fig. 1: The general concept of the negative feedback loop to control the dynamic behavior of the system

The PID controller has three separate constant parameters: Proportional (P), Integral (I) and Derivative (D). It can be said the P depends on present error, I on accumulation of past errors and D is prediction of future errors based on rate of change. The PID controller calculates an error value as the difference between a measured process variable and a desired set point. The controller attempts to minimize the control error by adjusting the process controller outputs. After corrective action from the controller, the system should reach point of stability. As stability means the set point is being held on the output without oscillating around it.