

Kp and Ki Controller Parameter Settings

SUPERSEDES: New

EFFECTIVE: April 5, 2013

Plant ID: 001-4171

Overview

This document is designed to give general tuning guidelines for the Kp and Ki PI loop parameters found in some iWorx[®] controllers. This document does not mathematically explain how to calculate Kp and Ki parameters. If more information on PI control loop tuning is desired, please see the references section.

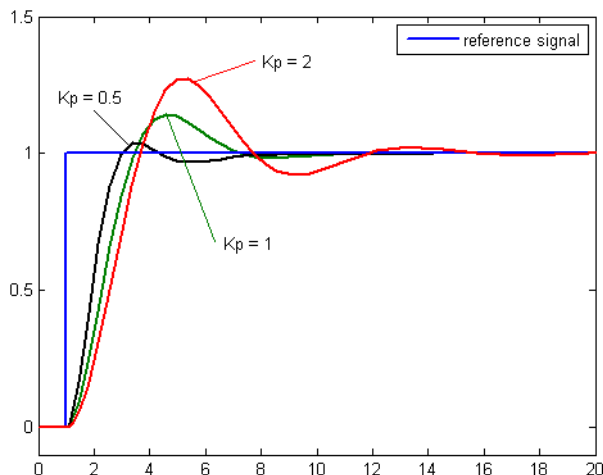
General Tuning Tips

- The default values programmed into iWorx controllers will give effective results in the majority of systems. Only attempt tuning if there is a deficiency in system response.
- Change one parameter (Kp or Ki) at a time.
- Manipulate the system to test response after each change.
- Small changes are often all that is necessary.
- Default values for controller Kp and Ki values can be found in the corresponding iWorx[®] Controller *Application Guide*.

Parameter Explanations

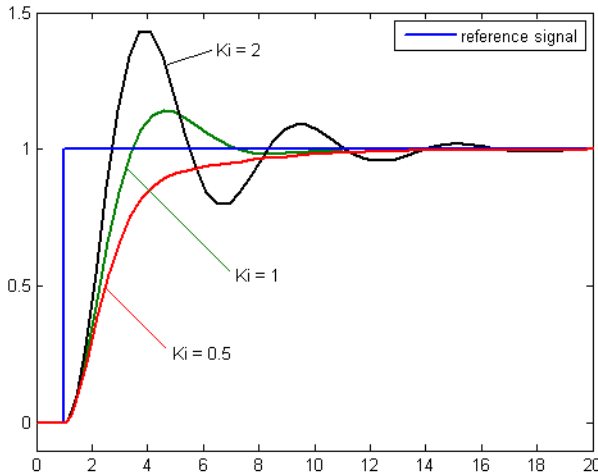
Kp: Kp is an abbreviation for "proportional constant," which is also commonly referred to as gain. An increase in Kp results in a more rapidly changing PI loop output response. A decrease in Kp slows down the response of the PI loop output. If the Kp value is set too high, the output value may oscillate or run away. If this happens, reduce the Kp value.

Figure 1: Kp Step Response

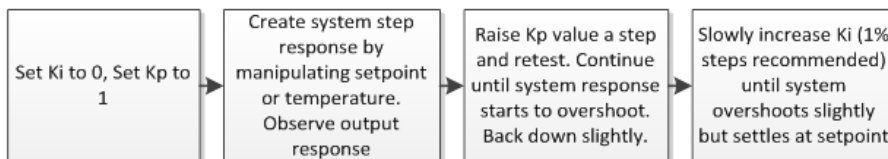


Ki: Ki is an abbreviation for "integral constant." The integral portion of a PI loop causes the PI loop output to change at a rate proportional to the error. It is used to reduce output error. Raising the Ki value allows the PI loop output to change more rapidly. Lowering the Ki value slows the PI loop output response. A Ki value that is too high may allow the PI output to oscillate and settle slowly. If this happens, lower the Ki value. A Ki value that is too low may never allow the system to reach setpoint. If this happens, increase the Ki value.

Figure 2: Ki Step Response



Recommended Tuning Procedure



References

St. Clair, David W. *Controller Tuning and Control Loop Performance*. Straight-Line Control Company Inc., Print.

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