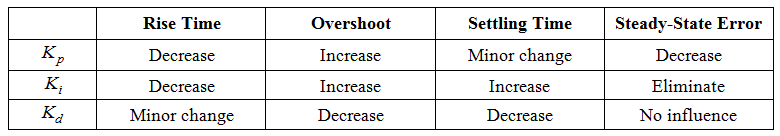
**Name:**

**Lab 9 Report**

The objective of this lab was to find the effects of each controller on system performance. The table below shows how each controller coefficient will change the rise time, overshoot, settling time and steady-state of a system response.



**P controller**

Based on the responses you saved for each P value, please complete the table below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| KP | Peak Time | Settling Time | Max. Overshoot | Steady State Error | Is it a stable system? | System Type |
| 0.05 |  |  |  |  |  |  |
| 0.5 |  |  |  |  |  |  |
| 0.3 |  |  |  |  |  |  |
| 0.6 |  |  |  |  |  |  |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |

**Comments:** Which KP value will be the optimal to follow the desired trajectory (square waveform)?

**PI Controller**

Based on the responses you saved for each KP and KI values, please complete the table below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| KP | KI | Peak Time | Settling Time | Max. Overshoot | Steady State Error | Is it a stable system? | System Type |
| 0.1 | 0.001 |  |  |  |  |  |  |
| 0.1 | 0.01 |  |  |  |  |  |  |
| 0.1 | 0.05 |  |  |  |  |  |  |
| 0.1 | 0.1 |  |  |  |  |  |  |
| 0.1 | 0.3 |  |  |  |  |  |  |
| 0.1 | 0.8 |  |  |  |  |  |  |
| 0.1 | 1.5 |  |  |  |  |  |  |
| 0.1 | 2.0 |  |  |  |  |  |  |
| 0.1 | 3.0 |  |  |  |  |  |  |
| 0.1 | 10.0 |  |  |  |  |  |  |

**Comments:** Which KI value will be the optimal to follow the desired trajectory (square waveform)?

**PD Controller**

Based on the responses you saved for each KP and KD values, please complete the table below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| KP | KD | Peak Time | Settling Time | Max. Overshoot | Steady State Error | Is it a stable system? | System Type |
| 0.1 | 0.001 |  |  |  |  |  |  |
| 0.1 | 0.005 |  |  |  |  |  |  |
| 0.1 | 0.01 |  |  |  |  |  |  |
| 0.1 | 0.02 |  |  |  |  |  |  |
| 0.1 | 0.03 |  |  |  |  |  |  |
| 0.1 | 0.05 |  |  |  |  |  |  |
| 0.1 | 0.08 |  |  |  |  |  |  |
| 0.1 | 0.1 |  |  |  |  |  |  |
| 0.1 | 1 |  |  |  |  |  |  |

**Comments:** Which KD value will be the optimal to follow the desired trajectory (square waveform)?

**PID Controller**

Based on the responses you saved for each KP and KD values, please complete the table below.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| KP | KD | KI | Peak Time | Settling Time | Max. Overshoot | Steady State Error | Is it a stable system? | System Type |
| 0.1 | 0 | 0.8 |  |  |  |  |  |  |
| 0.1 | 0.001 | 0.8 |  |  |  |  |  |  |
| 0.1 | 0.01 | 0.8 |  |  |  |  |  |  |
| 0.1 | 0.03 | 0.8 |  |  |  |  |  |  |
| 0.1 | 0.04 | 0.8 |  |  |  |  |  |  |
| 0.1 | 0.05 | 0.8 |  |  |  |  |  |  |
| 0.1 | 0.2 | 0.8 |  |  |  |  |  |  |

**Comments:**