**Ball and Beam Experiment Report – MyRIO version**

**Experiment Result**

1. **Calibration**

**(1) Position**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Position | -30 | -10 | 0 | 10 | 30 |
| Voltage | 5.97 | 5.02 | 4.54 | 4.07 | 3.11 |
| a= -20.986 b= 95.319 | | | | | | |

**(2) Angle**

3.04

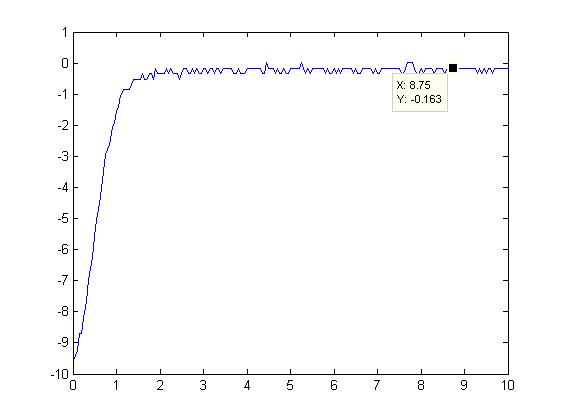
a= 35.714 b= -118.57

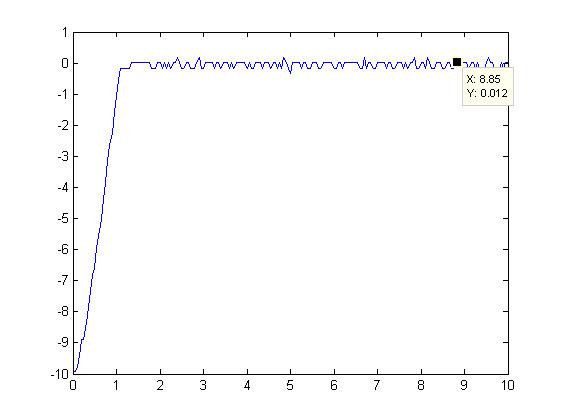
**2. Beam Angle Control**

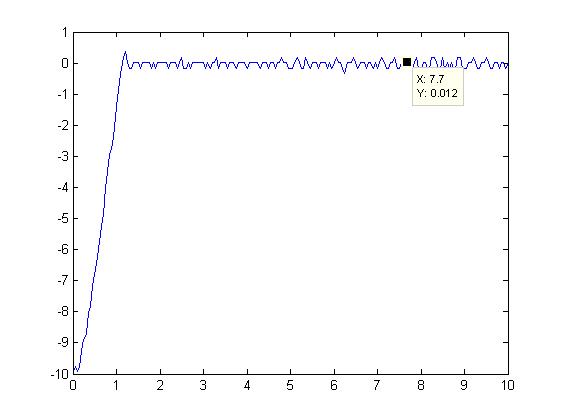
(1) Desired angle is 0. Please Record the Steady-error and the data in different

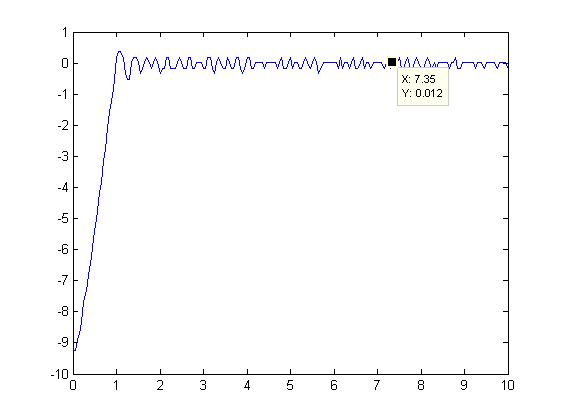
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 3 | 5 | 7 | 15 | 20 |
| Steady-error | 0.163 | 0.012 | 0.0116 | 0.0116 | 0.75震盪 | 1.2 震盪 |

(2)Data Plot

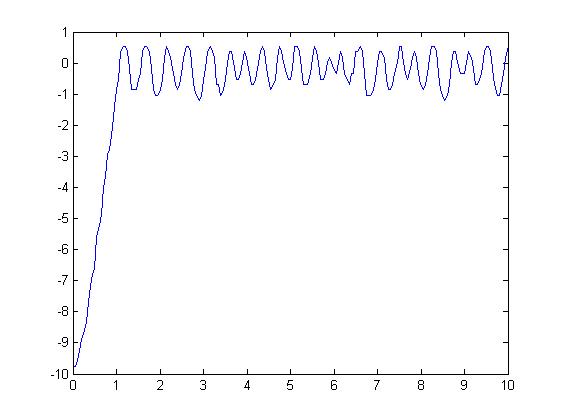


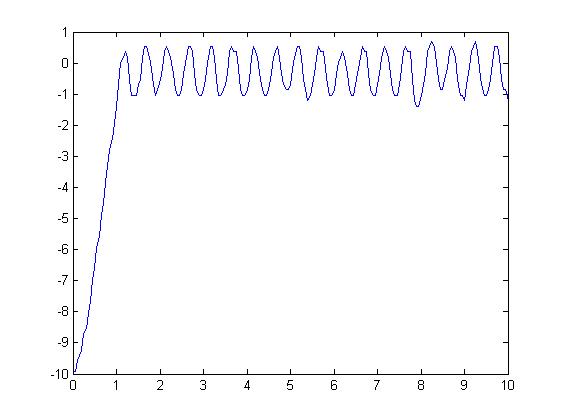






5





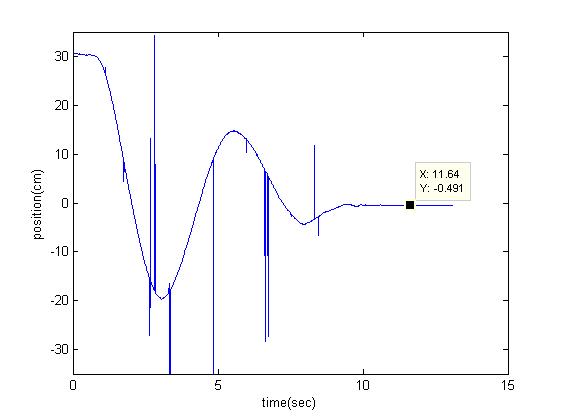
**3. BALL AND BEAM EXPERIMENT - PART I**

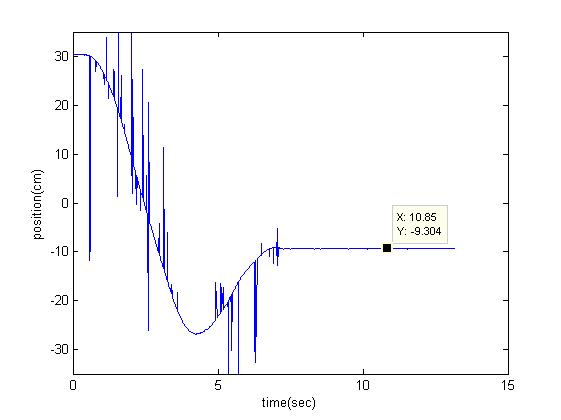
(1) Find the parameter of the control ,with different damping ratio  and natural frequency

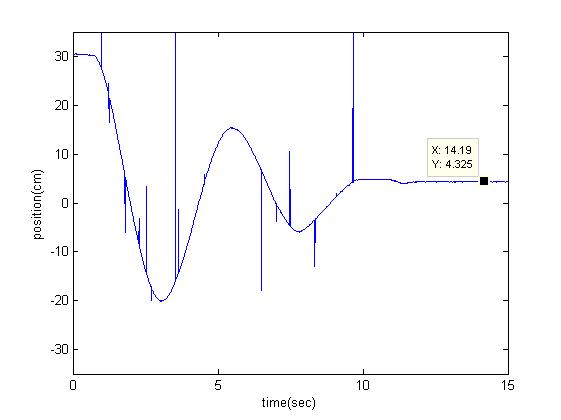
|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | 0.918 | 0.612 |
|  | 0.102 | 0.144 |
|  | 0.918 | 0.433 |
|  | 0.102 | 0.102 |
|  | 0.918 | 0.306 |

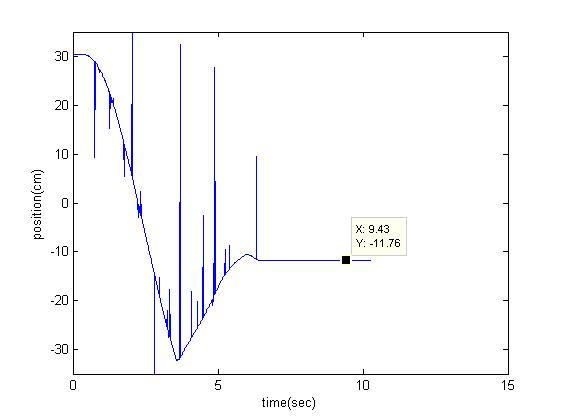


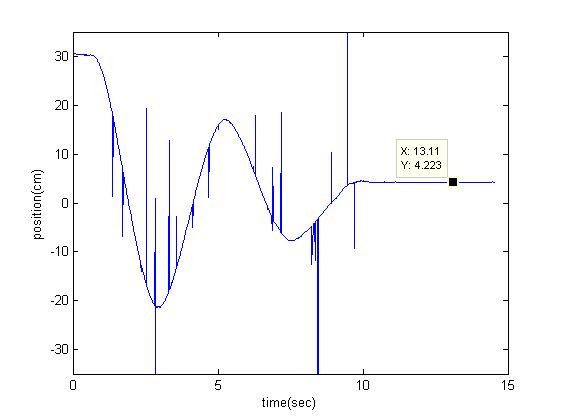
(2) Desired position is 0 cm. Set up all the parameter and plot the performance data.











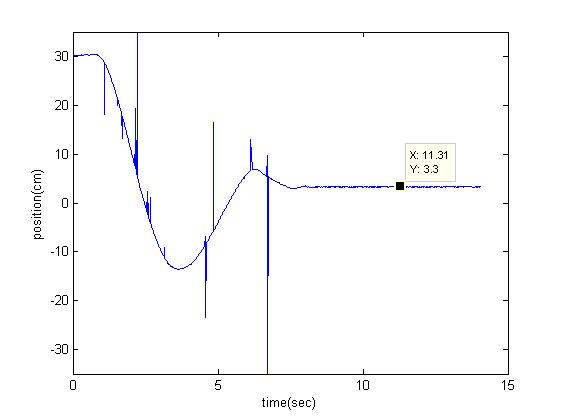
**4. BALL AND BEAM EXPERIMENT - PART II**

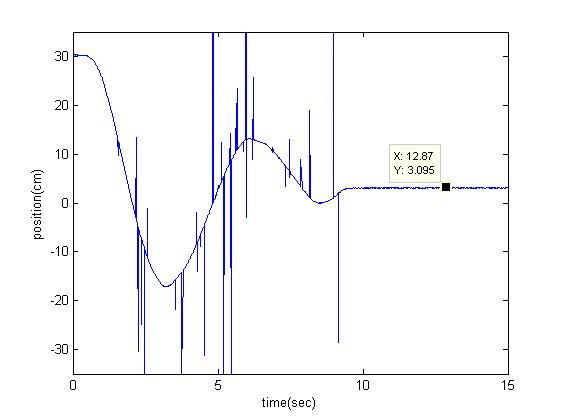
(1) Find the parameter of the control ,with different damping ratioand natural frequency , decay rate a

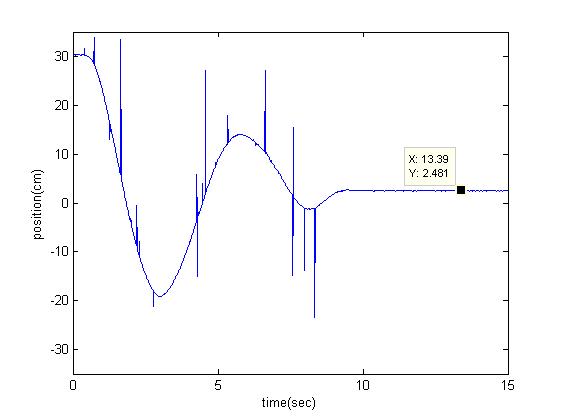
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| 1 | 3 | 10 | 0.574 | 16 | 0.440 |
| 0.707 | 3 | 10 | 0.6448 | 14.242 | 0.368 |
| 0.707 | 3 | 20 | 0.7577 | 24.242 | 0.395 |
| 0.5 | 3 | 20 | 0.7986 | 23 | 0.306 |

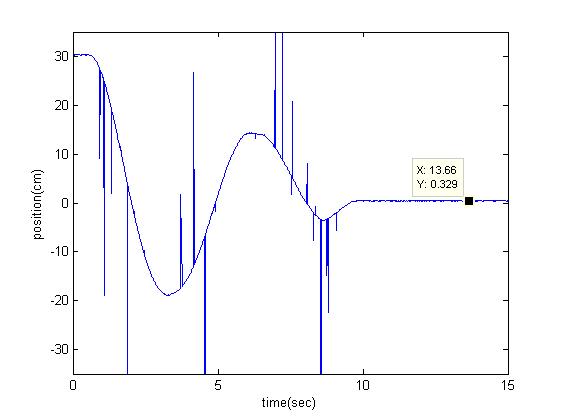


(2) Desired position is 0 cm. Set up all the parameter and plot the performance data.



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