實驗數據、數據分析

A.轉動慣量的測量

y=0.738, r=0.029275

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| m (kg) | t1 | t2 | t3 | t4 | t5 | 平均值 | 標準差 | I |
| 0.100 | 4.75 | 4.78 | 4.7 | 4.7 | 4.82 | 4.75 | 0.0520 | 0.01275 |
| 0.200 | 3.28 | 3.35 | 3.37 | 3.28 | 3.37 | 3.33 | 0.0464 | 0.01245 |
| 0.300 | 2.75 | 2.72 | 2.7 | 2.75 | 2.71 | 2.726 | 0.0230 | 0.01243 |
| 0.400 | 2.3 | 2.38 | 2.36 | 2.33 | 2.38 | 2.35 | 0.0346 | 0.01223 |
| 0.500 | 2.13 | 2.13 | 2.13 | 2.14 | 2.14 | 2.134 | 0.0055 | 0.01253 |

=0.012477 =0.00017

B.陀螺進動角速度與力矩的關係

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| m' (kg) | t1 | t2 | t3 | t4 | t5 | 平均值 | 標準差 |
| 0.03 | 19.15 | 18.6 | 17.4 | 18.5 | 19.3 | 18.59 | 0.748665479 |
| 0.04 | 14.6 | 15.25 | 14.55 | 14.45 | 14.67 | 14.704 | 0.315562989 |
| 0.05 | 11.7 | 12 | 11.95 | 12.05 | 11.85 | 11.91 | 0.138744369 |

|  |  |  |
| --- | --- | --- |
| 角速度實際值 | 角速度理論值 | 誤差百分比 |
| 0.337987375 | 0.320145978 | 6% |
| 0.427311297 | 0.426861305 | 0% |
| 0.527555441 | 0.533576631 | 1% |

誤差來源與解釋

A.轉動慣量的測量

我們的時間是人眼觀察位置、手機計時、手動暫停，人為因素所造成的誤差不少，除此之外還有摩擦力沒有考慮

B.陀螺進動角速度與力矩的關係

雖然角度與計時都換成電腦監控，但是重物落地時釋放陀螺儀的時機還是人眼判斷，而且摩擦力依舊存在