# 振幅$\theta$与固有周期 $T_0$的关系

| 次数 | 振幅 | 固有周期 |
|---|---|---|
| 1 | 144.0 | 1.69220 |
| 2 | 142.0 | 1.69170 |
| 3 | 141.0 | 1.69140 |
| 4 | 139.5 | 1.69110 |
| 5 | 138.0 | 1.69070 |
| 6 | 136.5 | 1.69030 |
| 7 | 135.5 | 1.69000 |
| 8 | 134.0 | 1.68960 |
| 9 | 132.0 | 1.68930 |
| 10 | 131.0 | 1.68880 |
| 11 | 129.5 | 1.68860 |
| 12 | 128.5 | 1.68820 |
| 13 | 126.5 | 1.68780 |
| 14 | 125.5 | 1.68740 |
| 15 | 124.0 | 1.68700 |
| 16 | 122.5 | 1.68660 |
| 17 | 121.5 | 1.68620 |
| 18 | 120.0 | 1.68590 |
| 19 | 118.5 | 1.68570 |
| 20 | 117.5 | 1.68510 |
| 21 | 116.0 | 1.68500 |
| 22 | 114.5 | 1.68460 |
| 23 | 113.5 | 1.68410 |
| 24 | 112.0 | 1.68390 |
| 25 | 110.5 | 1.68360 |
| 26 | 109.5 | 1.68320 |
| 27 | 108.0 | 1.68280 |
| 28 | 106.5 | 1.68250 |
| 29 | 105.5 | 1.68230 |
| 30 | 104.5 | 1.68200 |
| 31 | 103.0 | 1.68140 |
| 32 | 101.5 | 1.68110 |
| 33 | 100.5 | 1.68070 |
| 34 | 99.5 | 1.68060 |
| 35 | 98.5 | 1.68030 |
| 36 | 97.5 | 1.67990 |
| 37 | 96.5 | 1.67970 |
| 38 | 95.0 | 1.67950 |
| 39 | 93.5 | 1.67920 |
| 40 | 92.5 | 1.67890 |
| 41 | 91.5 | 1.67860 |
| 42 | 90.5 | 1.67830 |
| 43 | 89.0 | 1.67790 |
| 44 | 87.5 | 1.67770 |

| 次数 | 振幅 | 固有周期 |
|---|---|---|
| 45 | 86.5 | 1.67730 |
| 46 | 85.5 | 1.67690 |
| 47 | 84.5 | 1.67690 |
| 48 | 83.5 | 1.67650 |
| 49 | 82.5 | 1.67650 |
| 50 | 81.5 | 1.67580 |
| 51 | 80.5 | 1.67570 |
| 52 | 79.0 | 1.67560 |
| 53 | 77.5 | 1.67530 |
| 54 | 76.5 | 1.67480 |
| 55 | 75.5 | 1.67490 |
| 56 | 74.5 | 1.67450 |
| 57 | 73.5 | 1.67440 |
| 58 | 72.5 | 1.67420 |
| 59 | 71.0 | 1.67410 |
| 60 | 69.5 | 1.67360 |
| 61 | 68.5 | 1.67350 |
| 62 | 67.5 | 1.67300 |
| 63 | 66.5 | 1.67270 |
| 64 | 65.0 | 1.67260 |
| 65 | 63.5 | 1.67250 |
| 66 | 62.5 | 1.67190 |
| 67 | 61.5 | 1.67180 |
| 68 | 60.5 | 1.67150 |
| 69 | 59.5 | 1.67140 |
| 70 | 58.5 | 1.67120 |
| 71 | 57.0 | 1.67110 |
| 72 | 55.5 | 1.67080 |
| 73 | 55.0 | 1.67050 |
| 74 | 53.5 | 1.67050 |
| 75 | 52.5 | 1.67100 |
| 76 | 51.5 | 1.67060 |
| 77 | 50.5 | 1.67040 |
| 78 | 49.0 | 1.67020 |
| 79 | 47.5 | 1.67020 |
| 80 | 46.5 | 1.66930 |
| 81 | 45.5 | 1.67000 |
| 82 | 44.5 | 1.66960 |
| 83 | 43.5 | 1.66940 |
| 84 | 42.5 | 1.66890 |
| 85 | 41.0 | 1.66860 |
| 86 | 40.5 | 1.66830 |
| 87 | 39.5 | 1.66780 |
| 88 | 38.5 | 1.66680 |

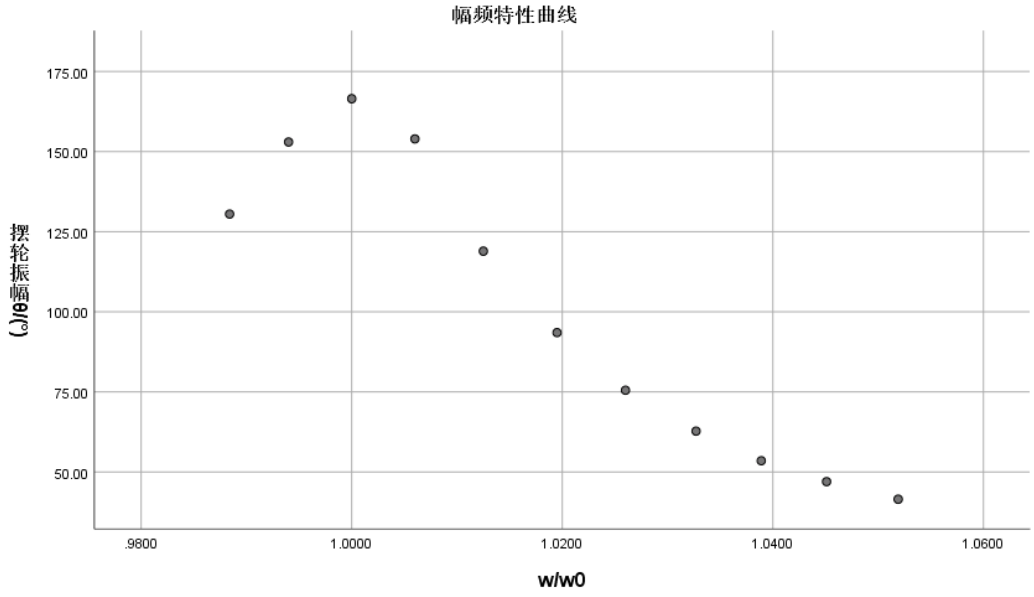
| 次数 | 振幅 | 固有周期 |
|---|---|---|
| 89 | 37.5 | 1.66660 |
| 90 | 37.0 | 1.66600 |
| 91 | 36.5 | 1.66640 |
| 92 | 35.5 | 1.66590 |
| 93 | 34.5 | 1.66560 |
| 94 | 34.0 | 1.66540 |
| 95 | 33.5 | 1.66500 |
| 96 | 32.5 | 1.66430 |
| 97 | 31.5 | 1.66410 |
| 98 | 31.0 | 1.66410 |
| 99 | 30.5 | 1.66430 |
| 100 | 29.5 | 1.66440 |
| 101 | 29.0 | 1.66400 |
| 102 | 28.5 | 1.66390 |
| 103 | 28.5 | 1.66370 |
| 104 | 27.5 | 1.66330 |
| 105 | 27.0 | 1.66290 |
| 106 | 26.5 | 1.66270 |
| 107 | 26.0 | 1.66240 |
| 108 | 25.5 | 1.66230 |
| 109 | 25.0 | 1.66230 |
| 110 | 24.5 | 1.66230 |
| 111 | 24.0 | 1.66240 |
| 112 | 23.5 | 1.66280 |
| 113 | 23.0 | 1.66260 |
| 114 | 22.5 | 1.66250 |
| 115 | 22.0 | 1.66240 |
| 116 | 21.5 | 1.66220 |
| 117 | 21.0 | 1.66210 |
| 118 | 20.5 | 1.66210 |

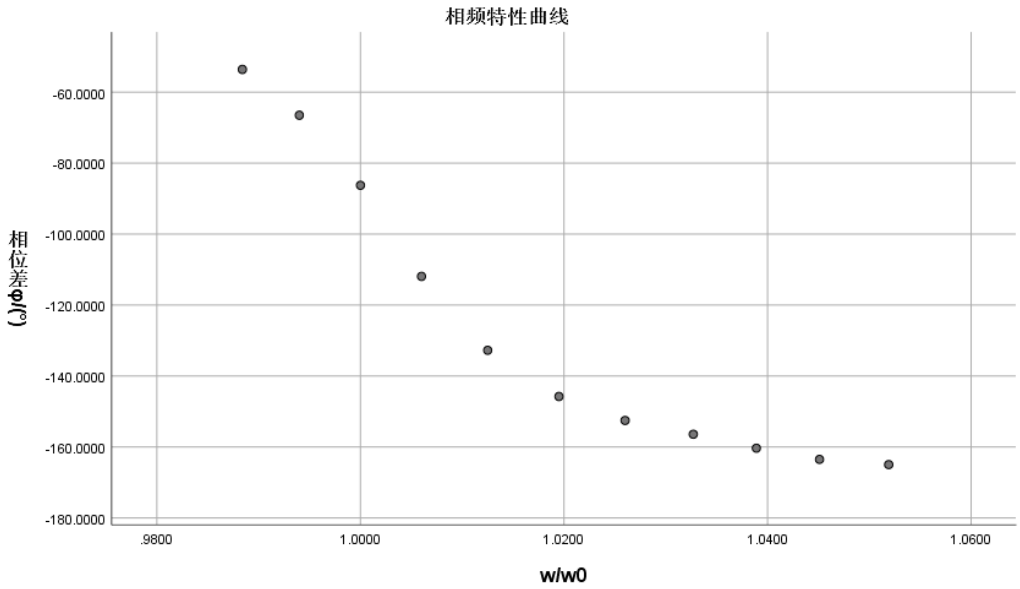
## 振幅$\theta$与周期$T$的关系

| 阻尼档 3 | | | | 阻尼系数 0.06246 | | |
|---|---|---|---|---|---|---|
| 序号 | 振幅 θ/° | 周期 T/s | 序号 | 振幅 θ/° | 周期 T/s | $\ln\frac{\theta_i}{\theta_{i+5}}$ |
| 1 | 77.5 | 1.6807 | 6 | 46.5 | 1.6670 | 0.5108256 |
| 2 | 70.0 | 1.6779 | 7 | 41.0 | 1.6683 | 0.5228018 |
| 3 | 63.0 | 1.6755 | 8 | 37.5 | 1.6670 | 0.5187983 |
| 4 | 57.0 | 1.6721 | 9 | 33.5 | 1.6682 | 0.5315058 |
| 5 | 51.0 | 1.6709 | 10 | 29.5 | 1.6677 | 0.5474353 |
| $\ln\frac{\theta_i}{\theta_{i+5}}$平均值 | | | | | | 0.5262734 |
| $\overline{T}=1.68303$ | | | $\beta$=0.06254 | | | |

## 受迫振动的振幅特征和相频特征

| 阻尼档 | | | | | | |
|---|---|---|---|---|---|---|
| 序号 | 电机周期 T/s | 摆轮振幅 θ/(°) | 查表 1 得出的与振幅 θ 对应的 $T_0$/s | 相位差 φ/(°) | $\varphi=\arctan\frac{-\beta T_0^2 T}{\pi(T^2-T_0^2)}$ | $\frac{\omega}{\omega_0}=\frac{T_0}{T}$ |
| 1 | 1.59999 | 41.5 | 1.6831 | -164.9760 | 18.3 | 1.0519 |
| 2 | 1.61006 | 47.0 | 1.6827 | -163.5014 | 20.8 | 1.0451 |
| 3 | 1.61960 | 53.5 | 1.6826 | -160.3329 | 23.7 | 1.0389 |
| 4 | 1.62963 | 62.75 | 1.6829 | -156.4077 | 27.5 | 1.0327 |
| 5 | 1.64030 | 75.5 | 1.6829 | -152.5219 | 33.2 | 1.0260 |
| 6 | 1.65018 | 93.5 | 1.6823 | -145.7767 | 41.0 | 1.0195 |
| 7 | 1.66040 | 118.91 | 1.6812 | -132.7546 | 53.4 | 1.0125 |
| 8 | 1.67006 | 153.96 | 1.6800 | -111.9172 | 70.5 | 1.0060 |
| 9 | 1.68003 | 166.5 | 1.6800 | -86.2477 | -89.9 | 1.0000 |
| 10 | 1.69021 | 153.0 | 1.6800 | -66.5017 | -70.1 | 0.9940 |
| 11 | 1.70019 | 130.5 | 1.6804 | -53.5936 | -55.0 | 0.9884 |




相频特性曲线
-60.0000
-80.0000
-100.0000
-120.0000
-140.0000
-160.0000
-180.0000
相位差φ(°)
.9800
1.0000
1.0200
1.0400
1.0600
w/w0