Data collected, 2 June 2013, Cornwall NY USA

We offer two data sets for the same configuration.

Data Collected with rocks in prune container 2 June 2013.

Dimension of the container are: height 0.13 m, top diameter 0.105 m, bottom diameter = 0.085 m. Container had blue clipon top on the top.

Total Mass is 513.29 g or 0.51329 kg. Cover, Container, Rocks, and Some water on rocks.

g = 9.80419 m/s^2 was the acceleration due to gravity for our location found in Wolfram Alpha, http : // www.wolframalpha.com .

At static equilibrium (still) the container top was 0.061 m above the water line.

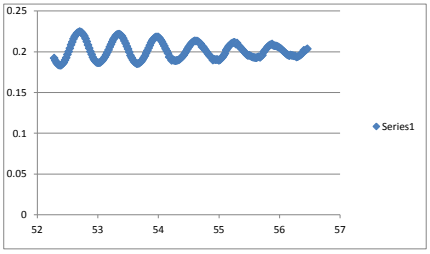
Data column on the Left

The time of each observation (in increments of 0.02 s) is recorded and the distance from the venire Go!Motion motion detector to the top of the container is recorded in meters. The picture of the entire apparatus shows an inverted container - with lid down - used in earlier experiments. The container for this data is depicted below and was NOT inverted, i.e. the blue top cover was on top during the data collection. You will want to center it at start the clock at t = 0 as we do with the data set on the right.

The data is excerpted from a series of attempts to get smooth "bobbing" (as the container wobbled as it bobbed, causing extra "noise" in the data). A plot of the data is offered to the right of the data set.

Time (seconds)	Distance (meters)
52.28	0.192116
52.3	0.189075
52.32	0.186364
52.34	0.184331
52.36	0.183566
52.38	0.183201
52.4	0.183601
52.42	0.185043
52.44	0.186746
52.46	0.189666
52.48	0.192637
52.5	0.19653
52.52	0.200248
52.54	0.204245
52.56	0.20845
52.58	0.211978
52.6	0.215783
52.62	0.218598
52.64	0.220805
52.66	0.222873
52.68	0.223864
52.7	0.224628
52.72	0.224176
52.74	0.223273
52.76	0.221361
52.78	0.219172
52.8	0.216096
52.82	0.212395
52.84	0.208259
52.86	0.204367
52.88	0.200231
52.9	0.196755
52.92	0.193193
52.94	0.190274
52.96	0.188536
52.98	0.186868
53	0.186468
53.02	0.186312
53.04	0.186712
53.06	0.187997
53.08	0.189301
53.1	0.191421
53.12	0.193593
53.14	0.196182
53.16	0.199258
53.18	0.202247
53.2	0.205878
53.22	0.208989
53.24	0.212047
53.26	0.215175
53.28	0.217434
53.3	0.219745
53.32	0.220909
53.34	0.221448
53.36	0.221518
53.38	0.220388
53.4	0.218928
53.42	0.216374
53.44	0.213281
53.46	0.210309
53.48	0.206626
53.5	0.203376
53.52	0.199484
53.54	0.19547
53.56	0.192585
53.58	0.189909
53.6	0.187737
53.62	0.186294
53.64	0.185321
53.66	0.185321
53.68	0.185756
53.7	0.186937
53.72	0.188015
53.74	0.190135
53.76	0.192602
53.78	0.194948
53.8	0.198285
53.82	0.20143
53.84	0.204558
53.86	0.207842
53.88	0.211039
53.9	0.213715
53.92	0.215575
53.94	0.21726
53.96	0.21806
53.98	0.218094
54	0.217938

This is a picture of the apparatus. In fact the actual container orientation for these data collections was with the blue lid on the top during bobbing - wider than bottom.

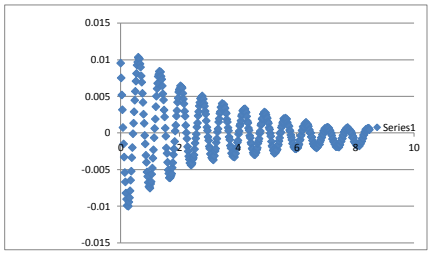


Here the horizontal axis is "raw" time on the clock for collection and the vertical axis is distance from the sensor which (as depicted) rested above the bobbing container.

Data right column

This data has been extracted and extended from the original data set of observations.
The average distance has been computed and subtracted from each data distance.
This makes the data centered about 0 m which is the static equilibrium at which the container is at rest in the water. The time has also been initialized to t = 0 s.
A plot of the data is offered to the right of this data set.
This is the data set which should be used in analysis. You may elect to use some of it or all of it.

Time (seconds)	Distance (meters)
0	0.00954
0.02	0.00752
0.04	0.00518
0.06	0.00317
0.08	0.00075
0.1	-0.0015
0.12	-0.0033
0.14	-0.00541
0.16	-0.00669
0.18	-0.00821
0.2	-0.00904
0.22	-0.00992
0.24	-0.00989
0.26	-0.01001
0.28	-0.00942
0.3	-0.00885
0.32	-0.00791
0.34	-0.00646
0.36	-0.00523
0.38	-0.00338
0.4	-0.002
0.42	-0.0001
0.44	0.00132
0.46	0.00288
0.48	0.00447
0.5	0.00568
0.52	0.00708
0.54	0.00812
0.56	0.00926
0.58	0.00968
0.6	0.01034
0.62	0.01016
0.64	0.01013
0.66	0.00944
0.68	0.00899
0.7	0.00779
0.72	0.00693
0.74	0.00541
0.76	0.00418
0.78	0.00255
0.8	0.00131
0.82	-0.00034
0.84	-0.0015
0.86	-0.00305
0.88	-0.00402
0.9	-0.00534
0.92	-0.00594
0.94	-0.00677
0.96	-0.00734
0.98	-0.00734
1	-0.00753
1.02	-0.00696
1.04	-0.00665
1.06	-0.00563
1.08	-0.0048
1.1	-0.00345
1.12	-0.00231
1.14	-0.00065
1.16	0.00061
1.18	0.00189
1.2	0.00359
1.22	0.00502
1.24	0.00605
1.26	0.00679
1.28	0.00772
1.3	0.00802
1.32	0.00842
1.34	0.00828
1.36	0.00835
1.38	0.00774
1.4	0.00734
1.42	0.00644
1.44	0.00534
1.46	0.00451
1.48	0.00312
1.5	0.00219
1.52	0.00065
1.54	-0.00046
1.56	-0.00205
1.58	-0.00278
1.6	-0.00402
1.62	-0.00506
1.64	-0.00553
1.66	-0.00613
1.68	-0.00615
1.7	-0.00599
1.72	-0.00582



Here the horizontal axis is "shifted" time back to time t = 0 at start and the vertical axis is the displacement of the average or equilibrium position from the surface of the water, positive being up above the surface of the water and negative being down below the surface of the water.

54.02	0.216739
54.04	0.214532
54.06	0.212447
54.08	0.209684
54.1	0.206886
54.12	0.203706
54.14	0.200995
54.16	0.198059
54.18	0.193384
54.2	0.193419
54.22	0.189249
54.24	0.189892
54.26	0.189283
54.28	0.188779
54.3	0.189179
54.32	0.189544
54.34	0.190048
54.36	0.191125
54.38	0.192394
54.4	0.194079
54.42	0.195834
54.44	0.198111
54.46	0.200387
54.48	0.203029
54.5	0.205531
54.52	0.207529
54.54	0.20984
54.56	0.211335
54.58	0.212395
54.6	0.213246
54.62	0.21309
54.64	0.21309
54.66	0.212169
54.68	0.210779
54.7	0.209614
54.72	0.205983
54.74	0.20593
54.76	0.203654
54.78	0.201465
54.8	0.199623
54.82	0.197451
54.84	0.195435
54.86	0.194149
54.88	0.192481
54.9	0.189596
54.92	0.190691
54.94	0.190187
54.96	0.190361
54.98	0.190395
55	0.189266
55.02	0.190117
55.04	0.191838
55.06	0.193367
55.08	0.195383
55.1	0.197676
55.12	0.201899
55.14	0.203967
55.16	0.206434
55.18	0.207911
55.2	0.209632
55.22	0.210431
55.24	0.211283
55.26	0.211456
55.28	0.20925
55.3	0.210605
55.32	0.207651
55.34	0.2064
55.36	0.204853
55.38	0.203115
55.4	0.201569
55.42	0.199657
55.44	0.19818
55.46	0.196391
55.48	0.195192
55.5	0.195626
55.52	0.19474
55.54	0.193906
55.56	0.193245
55.58	0.193019
55.6	0.192707
55.62	0.192637
55.64	0.193297
55.66	0.193784
55.68	0.193037
55.7	0.19441
55.72	0.195748
55.74	0.199744
55.76	0.201604
55.78	0.203393
55.8	0.205305
55.82	0.20699
55.84	0.20805
55.86	0.208693
55.88	0.209458
55.9	0.207581
55.92	0.207355
55.94	0.207182
55.96	0.206434
55.98	0.205791
56	0.204784
56.02	0.203758
56.04	0.202368
56.06	0.200822
56.08	0.199727
56.1	0.198232
56.12	0.19679
56.14	0.195956
56.16	0.195105
56.18	0.195921
56.2	0.1954
56.22	0.195209

1.74	-0.00558
1.76	-0.00475
1.78	-0.00407
1.8	-0.00297
1.82	-0.00217
1.84	-0.00117
1.86	0.00027
1.88	0.00105
1.9	0.00231
1.92	0.00305
1.94	0.00419
1.96	0.00477
1.98	0.00558
2	0.00589
2.02	0.00608
2.04	0.00644
2.06	0.00625
2.08	0.00629
2.1	0.00613
2.12	0.00541
2.14	0.00464
2.16	0.00399
2.18	0.00297
2.2	0.00229
2.22	0.00103
2.24	0.00003
2.26	-0.00079
2.28	-0.00188
2.3	-0.0025
2.32	-0.00319
2.34	-0.00361
2.36	-0.00411
2.38	-0.00413
2.4	-0.00439
2.42	-0.00428
2.44	-0.00411
2.46	-0.00359
2.48	-0.0034
2.5	-0.003
2.52	-0.00222
2.54	-0.00138
2.56	-0.00074
2.58	-0.00016
2.6	0.00079
2.62	0.00136
2.64	0.00234
2.66	0.00291
2.68	0.00368
2.7	0.00416
2.72	0.00471
2.74	0.00473
2.76	0.0049
2.78	0.00506
2.8	0.00466
2.82	0.00463
2.84	0.00404
2.86	0.00366
2.88	0.00298
2.9	0.00257
2.92	0.00165
2.94	0.00077
2.96	0.00032
2.98	-0.00055
3	-0.00103
3.02	-0.00184
3.04	-0.00214
3.06	-0.00285
3.08	-0.00292
3.1	-0.00338
3.12	-0.00335
3.14	-0.00359
3.16	-0.00368
3.18	-0.00314
3.2	-0.00311
3.22	-0.00248
3.24	-0.00215
3.26	-0.00131
3.28	-0.00079
3.3	0.00013
3.32	0.00056
3.34	0.0015
3.36	0.00195
3.38	0.00267
3.4	0.00291
3.42	0.00352
3.44	0.00347
3.46	0.00402
3.48	0.00392
3.5	0.00373
3.52	0.0039
3.54	0.00347
3.56	0.00336
3.58	0.00279
3.6	0.00267
3.62	0.00186
3.64	0.0015
3.66	0.00073
3.68	0.0003
3.7	-0.00055
3.72	-0.00093
3.74	-0.00174
3.76	-0.00209
3.78	-0.00276
3.8	-0.00278
3.82	-0.00319
3.84	-0.00302
3.86	-0.00324
3.88	-0.0033
3.9	-0.00288
3.92	-0.00278
3.94	-0.00222

56.24	0.194809
56.26	0.194722
56.28	0.193419
56.3	0.193801
56.32	0.194879
56.34	0.195591
56.36	0.196755
56.38	0.198198
56.4	0.201499
56.42	0.201395
56.44	0.202142
56.46	0.203515

3.96	-0.00195
3.98	-0.00129
4	-0.00103
4.02	-0.00015
4.04	0.00025
4.06	0.00096
4.08	0.0012
4.1	0.00167
4.12	0.00231
4.14	0.00253
4.16	0.00304
4.18	0.00305
4.2	0.00324
4.22	0.00323
4.24	0.00329
4.26	0.00291
4.28	0.00279
4.3	0.00226
4.32	0.0016
4.34	0.00136
4.36	0.00067
4.38	0.00035
4.4	-0.00037
4.42	-0.00067
4.44	-0.00131
4.46	-0.00151
4.48	-0.0021
4.5	-0.00224
4.52	-0.00269
4.54	-0.00293
4.56	-0.00281
4.58	-0.00298
4.6	-0.00264
4.62	-0.00269
4.64	-0.00228
4.66	-0.00203
4.68	-0.00145
4.7	-0.00113
4.72	-0.00079
4.74	-0.00008
4.76	0.00025
4.78	0.00105
4.8	0.00127
4.82	0.00189
4.84	0.00203
4.86	0.00257
4.88	0.00255
4.9	0.00286
4.92	0.00267
4.94	0.00276
4.96	0.00248
4.98	0.00212
5	0.002
5.02	0.00151
5.04	0.00132
5.06	0.00072
5.08	0.00048
5.1	-0.00004
5.12	-0.00046
5.14	-0.00117
5.16	-0.00176
5.18	-0.00191
5.2	-0.00238
5.22	-0.00236
5.24	-0.00278
5.26	-0.00257
5.28	-0.00269
5.3	-0.00238
5.32	-0.0024
5.34	-0.00226
5.36	-0.00174
5.38	-0.00158
5.4	-0.00112
5.42	-0.00068
5.44	-0.00006
5.46	0.00011
5.48	0.00075
5.5	0.00098
5.52	0.00137
5.54	0.00153
5.56	0.00195
5.58	0.00191
5.6	0.00182
5.62	0.00203
5.64	0.00181
5.66	0.00191
5.68	0.00144
5.7	0.00115
5.72	0.00099
5.74	0.00091
5.76	0.00039
5.78	0.00025
5.8	-0.00027
5.82	-0.0006
5.84	-0.00094
5.86	-0.00145
5.88	-0.00148
5.9	-0.00191
5.92	-0.00188
5.94	-0.00214
5.96	-0.00198
5.98	-0.00217
6	-0.00191
6.02	-0.00202
6.04	-0.00203
6.06	-0.00174
6.08	-0.00153
6.1	-0.00105
6.12	-0.00091
6.14	-0.00039
6.16	-0.00027

6.18	0.00032
6.2	0.00037
6.22	0.00086
6.24	0.00091
6.26	0.00086
6.28	0.00127
6.3	0.00115
6.32	0.00144
6.34	0.0011
6.36	0.00122
6.38	0.00115
6.4	0.00091
6.42	0.00046
6.44	0.00039
6.46	-0.00001
6.48	0.00001
6.5	-0.00053
6.52	-0.00058
6.54	-0.00103
6.56	-0.00146
6.58	-0.0015
6.6	-0.00179
6.62	-0.00176
6.64	-0.00193
6.66	-0.00181
6.68	-0.00205
6.7	-0.00188
6.72	-0.00191
6.74	-0.0015
6.76	-0.0015
6.78	-0.00157
6.8	-0.0012
6.82	-0.00098
6.84	-0.00065
6.86	-0.0006
6.88	-0.00025
6.9	-0.00015
6.92	0.00028
6.94	0.00025
6.96	0.00061
6.98	0.00051
7	0.00046
7.02	0.00073
7.04	0.00058
7.06	0.00077
7.08	0.00051
7.1	0.00067
7.12	0.00034
7.14	0.00034
7.16	-0.00004
7.18	-0.00001
7.2	-0.00034
7.22	-0.00084
7.24	-0.00079
7.26	-0.00119
7.28	-0.00125
7.3	-0.00153
7.32	-0.00145
7.34	-0.00188
7.36	-0.00174
7.38	-0.00188
7.4	-0.00176
7.42	-0.00183
7.44	-0.00193
7.46	-0.00165
7.48	-0.0016
7.5	-0.00117
7.52	-0.00115
7.54	-0.00074
7.56	-0.00077
7.58	-0.00034
7.6	-0.0003
7.62	0.00015
7.64	0.00008
7.66	0.00042
7.68	0.00037
7.7	0.00065
7.72	0.00054
7.74	0.00075
7.76	0.00041
7.78	0.00034
7.8	0.00048
7.82	0.00009
7.84	0.00027
7.86	0.00016
7.88	-0.00006
7.9	-0.00061
7.92	-0.00044
7.94	-0.00068
7.96	-0.00119
7.98	-0.00115
8	-0.00143
8.02	-0.00138
8.04	-0.0017
8.06	-0.00155
8.08	-0.00169
8.1	-0.00155
8.12	-0.00162
8.14	-0.00177
8.16	-0.00148
8.18	-0.00148
8.2	-0.00113
8.22	-0.00115
8.24	-0.00072
8.26	-0.00074
8.28	-0.00029
8.3	-0.00025
8.32	0.00016
8.34	0.00013
8.36	0.00049
8.38	0.00042

8.4	0.00041
8.42	0.00061
8.44	0.00048
8.46	0.00065
8.48	0.00044