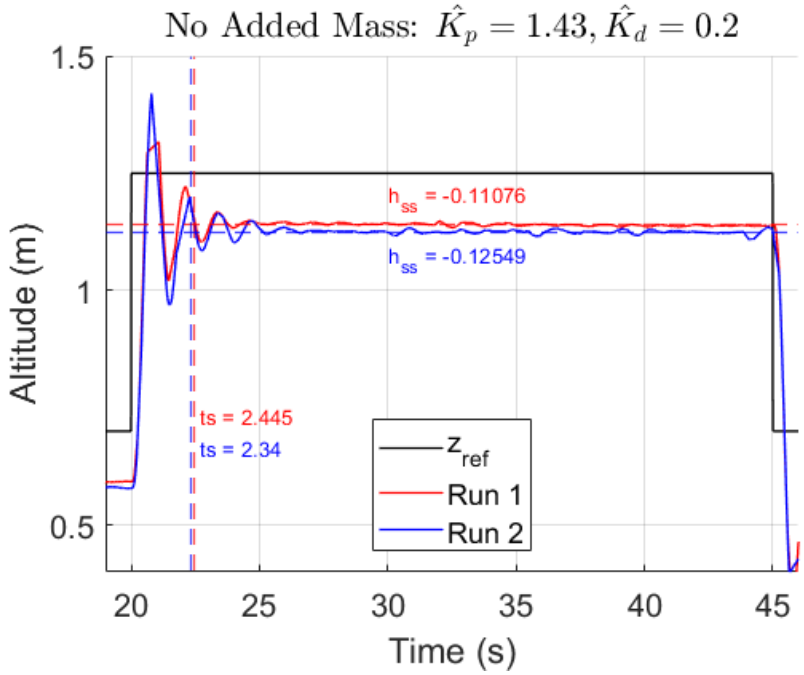
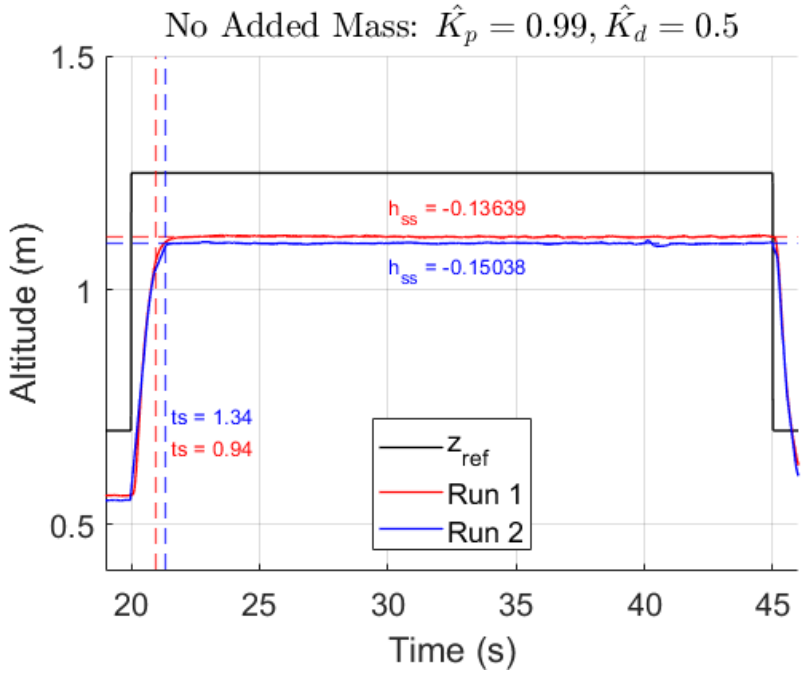
Flight Experiments

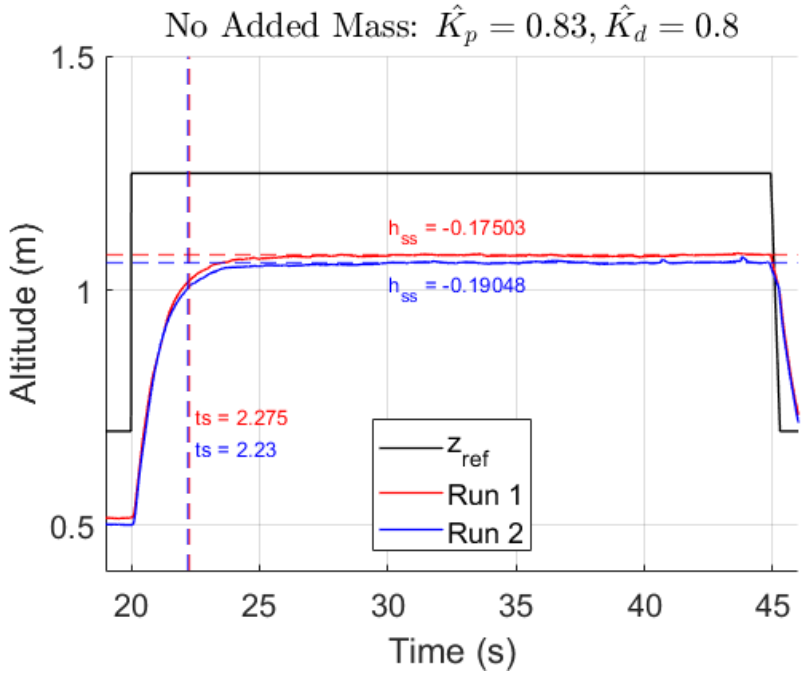
Trevor Burgoyne 13 Nov 2022

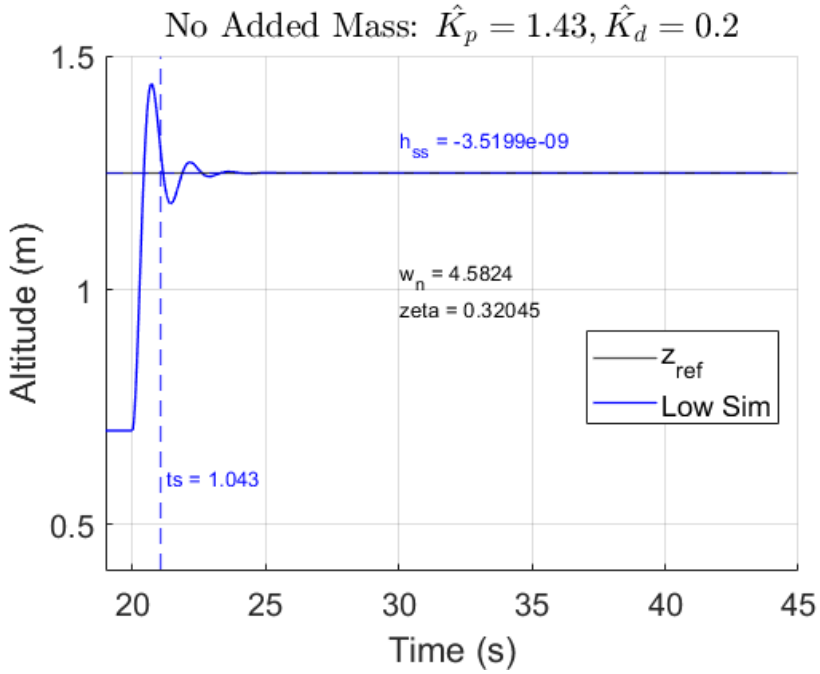
```
% Paths for data loading
ROOT_DIR = "C:/Users/Trevor/Desktop/AEM 4602W/Controls-Lab/Data/Part 1/";
PREFIX = "pjsdata_T";
DISP_NAME = "No Added Mass";
LABEL_NAME = "Run";
N_TESTS = 3;
N_RUNS = 2;
masses = [68.1, 68, 69.5] / 1000; % kg
[avg_hss, var_hss, avg_kt, var_kt, kphat, kdhat, kp, kd] = make_graphs(ROOT_DIR, PREFIX, DISP_NAME, LABEL_NAME, N_TESTS, N_RUNS, masses)
% Generate Low Fidelity Model Plots
for test_n=1:N_TESTS
    [wn, zeta] = Low_Fidelity_Model(DISP_NAME, masses(test_n), avg_kt(test_n), kp(test_n), kd(test_n));
end
```

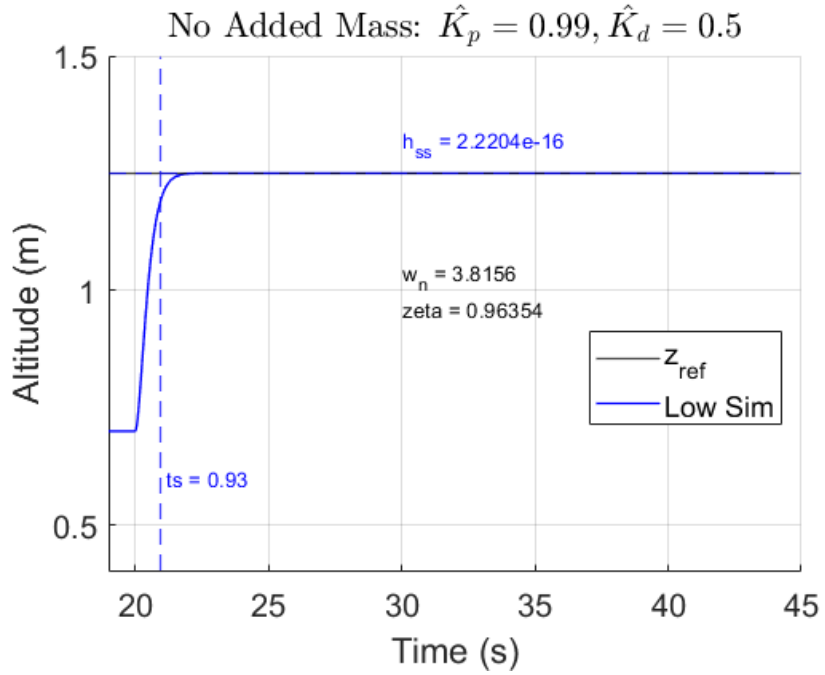
```
avg_hss =

   -0.1181   -0.1434   -0.1828


var_hss =

   1.0e-03 *

    0.1084    0.0977    0.1194


avg_kt =

    0.5240    0.5358    0.5237


var_kt =

   1.0e-04 *

    0.6498    0.4380    0.5865


kphat =

    1.4300    0.9900    0.8300


kdhat =

    0.2000    0.5000    0.8000


kp =

    0.6823    0.4619    0.3962


kd =

    0.0954    0.2333    0.3819
```

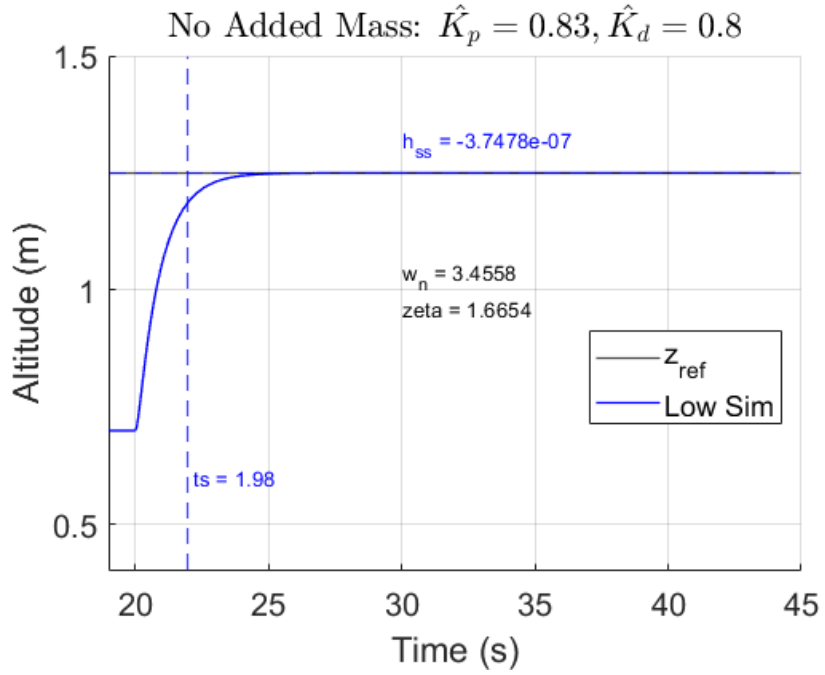

No Added Mass: $\hat{K}_p = 1.43, \hat{K}_d = 0.2$
Altitude (m)
Time (s)
1.5
1
0.5
20
25
30
35
40
45
h_{ss} = -0.11076
h_{ss} = -0.12549
ts = 2.445
ts = 2.34
z_{ref}
Run 1
Run 2


No Added Mass: $\hat{K}_p = 0.99, \hat{K}_d = 0.5$
Altitude (m)
Time (s)
1.5
1
0.5
20
25
30
35
40
45
h_{ss} = -0.13639
h_{ss} = -0.15038
ts = 1.34
ts = 0.94
z_{ref}
Run 1
Run 2


No Added Mass: $\hat{K}_p = 0.83, \hat{K}_d = 0.8$
1.5
1
0.5
Altitude (m)
20
25
30
35
40
45
Time (s)
h_{ss} = -0.17503
h_{ss} = -0.19048
ts = 2.275
ts = 2.23
z_{ref}
Run 1
Run 2


No Added Mass: $\hat{K}_p = 1.43, \hat{K}_d = 0.2$
1.5
1
0.5
Altitude (m)
20
25
30
35
40
45
Time (s)
h_{ss} = -3.5199e-09
w_n = 4.5824
zeta = 0.32045
ts = 1.043
z_{ref}
Low Sim





Published with MATLAB® R2020b