
Problem 3

```
clc; clear;
format long

load moicalcs01_data

[my_Mtot,my_rcmtot,my_IMoItot] =
    momentofinertia01(mvec,rcmmat,IMoIarray);

Mtot = 2.058306536059932e+02;

rcmtot = [0.409101895949622;0.526651850364819;0.058154823743388];

IMoItot = 1.0e+04 * [...
1.047260719697208 0.028550325166975 0.040407207761532;...
0.028550325166975 1.063729452526229 0.010880405279456;...
0.040407207761532 0.010880405279456 1.146269471862332];

disp('Checking with data set moicalcs01_data')
disp('Error in Mtot')
disp(Mtot-my_Mtot);
disp('Error in rcmtot')
disp(rcmtot-my_rcmtot);
disp('Error in IMoItot')
disp(IMoItot-my_IMoItot);

clear;

load moicalcs02_data
disp('Results with data set moicalcs02_data')
[Mtot,rcmtot,IMoItot] = momentofinertia01(mvec,rcmmat,IMoIarray)

Checking with data set moicalcs01_data
Error in Mtot
    2.842170943040401e-14

Error in rcmtot
    1.0e-15 *

    0.111022302462516
   -0.333066907387547
   -0.485722573273506

Error in IMoItot
    1.0e-11 *

    0.545696821063757    0.471800376544706   -0.170530256582424
    0.471800376544706                0    0.406430444854777
   -0.170530256582424    0.406430444854777   -0.181898940354586
```

Results with data set moicalcs02_data

Mtot =

2.797748586051755e+03

rcmtot =

1.166967057877594
0.342883847595047
1.288814940207648

IMoItot =

1.0e+06 *

0.839391302803123 -0.006045159569299 -0.415001439219734
-0.006045159569299 1.095252203770579 -0.018055436804117
-0.415001439219734 -0.018055436804117 0.395817419209069

Problem 4

```
clear;
a = 0.4;
b = 0.2;
c = 0.8;

l = 2.1;
w = 0.6;

M = 20;
m = 0.6;
theta = 0.523599;

rcm_panel_left = [0;-b/2-l/2;c/2];
rcm_box = [0;0;0];
rcm_panel_right = [0;b/2+l/2;c/2];

rcmmat = [rcm_panel_left,rcm_box,rcm_panel_right];
mvec = [m,M,m];

I_polar_panel = (m/12)*(l^2+w^2);
I_alongl_panel = (m/12)*(w^2);
I_alongw_panel = (m/12)*(l^2);

R2theta_pr = [cos(-theta) 0 -sin(-theta);...
               0          1          0;...
               sin(-theta) 0  cos(-theta)];
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Ipanel_left_principle = diag([I_alongw_panel I_alongl_panel
    I_polar_panel]);
Ipanel_right_principle = diag([I_alongw_panel I_alongl_panel
    I_polar_panel]);

Ipanel_left_b = R2theta_pr*Ipanel_left_principle*R2theta_pr';
Ipanel_right_b = R2theta_pr*Ipanel_right_principle*R2theta_pr';

Ibox_i_b = (M/12)*(b^2+c^2);
Ibox_j_b = (M/12)*(c^2+a^2);
Ibox_k_b = (M/12)*(a^2+b^2);

Ibox_b = diag([Ibox_i_b Ibox_j_b Ibox_k_b]);

IMoIarray(:, :, 1) = Ipanel_left_b;
IMoIarray(:, :, 2) = Ibox_b;
IMoIarray(:, :, 3) = Ipanel_right_b;

[my_Mtot, my_rcmtot, my_IMoItot] =
    momentofinertia01(mvec, rcmmat, IMoIarray);

Mtot = 21.200000000000003;
rcmtot = [0 ; 0; 0.022641509433962];

IMoItot = [...
    3.351465415801186 0 0.015588461307349; ...
    0 1.550465408805032 0; ...
    0.015588461307349 0 2.388333326337180];

disp('Checking with test data')
disp('Error in Mtot')
disp(Mtot-my_Mtot);
disp('Error in rcmtot')
disp(rcmtot-my_rcmtot);
disp('Error in IMoItot')
disp(IMoItot-my_IMoItot);

clear;
a = 0.3;
b = 0.4;
c = 0.6;

l = 1.1;
w = 0.5;

M = 15;
m = 0.8;
theta = 0.34906585;

rcm_panel_left = [0;-b/2-l/2;c/2];
rcm_box = [0;0;0];
rcm_panel_right = [0;b/2+l/2;c/2];

```

```

rcmmat = [rcm_panel_left,rcm_box,rcm_panel_right];
mvec = [m,M,m];

I_polar_panel = (m/12)*(l^2+w^2);
I_alongl_panel = (m/12)*(w^2);
I_alongw_panel = (m/12)*(l^2);

R2theta_pr = [cos(-theta) 0 -sin(-theta);...
               0          1          0;...
               sin(-theta) 0  cos(-theta)];

Ipanel_left_principle = diag([I_alongw_panel I_alongl_panel
                               I_polar_panel]);
Ipanel_right_principle = diag([I_alongw_panel I_alongl_panel
                                I_polar_panel]);

Ipanel_left_b = R2theta_pr*Ipanel_left_principle*R2theta_pr';
Ipanel_right_b = R2theta_pr*Ipanel_right_principle*R2theta_pr';

Ibox_i_b = (M/12)*(b^2+c^2);
Ibox_j_b = (M/12)*(c^2+a^2);
Ibox_k_b = (M/12)*(a^2+b^2);

Ibox_b = diag([Ibox_i_b Ibox_j_b Ibox_k_b]);

IMoIarray(:, :, 1) = Ipanel_left_b;
IMoIarray(:, :, 2) = Ibox_b;
IMoIarray(:, :, 3) = Ipanel_right_b;

[my_Mtot,my_rcmtot,my_IMoItot] =
    momentofinertia01(mvec,rcmmat,IMoIarray);

Mtot = 21.200000000000003;
rcmtot = [0 ; 0;0.022641509433962];

IMoItot = [...
3.351465415801186 0 0.015588461307349;...
0 1.550465408805032 0;...
0.015588461307349 0 2.388333326337180];

disp('Results:')
disp('Mtot')
disp(my_Mtot);
disp('rcmtot')
disp(my_rcmtot);
disp('IMoItot')
disp(my_IMoItot);

Checking with test data
Error in Mtot
0

```

Error in rcmtot
1.0e-15 *

0
0
-0.260208521396521

Error in IMoItot
1.0e-15 *

0.444089209850063	0	0.085001450322864
0	0.222044604925031	0
0.067654215563095	0	0

Results:

Mtot
16.600000000000001

rcmtot
0
0
0.028915662650602

1.845353074533848	0	0.010713126817924
0	0.725953815261044	0
0.010713126817924	0	1.403267407393863

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