

Appendix C

Mass, Stiffness, and Control Influence Matrices of the Flexible Spacecraft

For the rotating, flexible spacecraft introduced in Example 6.2, the mass matrix, $\mathbf{M}$, the stiffness matrix, $\mathbf{K}$, and the control influence matrix, $\mathbf{d}$, are as follows:

$\mathbf{M} =$

Columns 1 through 6

2.8196e+001	1.6917e-001	8.5926e-003	2.6583e-001	8.5926e-003	1.7362e+000
1.6917e-001	5.3857e-002	0	9.3214e-003	-2.9921e-003	0
8.5926e-003	0	2.4550e-003	2.9921e-003	-9.2063e-004	0
2.6583e-001	9.3214e-003	2.9921e-003	5.3857e-002	0	9.3214e-003
8.5926e-003	-2.9921e-003	-9.2063e-004	0	2.4550e-003	2.9921e-003
1.7362e+000	0	0	9.3214e-003	2.9921e-003	3.4081e-001
-3.2381e-002	0	0	-2.9921e-003	-9.2063e-004	-5.0635e-003
1.6917e-001	0	0	0	0	0
8.5926e-003	0	0	0	0	0
2.6583e-001	0	0	0	0	0
8.5926e-003	0	0	0	0	0
1.7362e+000	0	0	0	0	0
-3.2381e-002	0	0	0	0	0

Columns 7 through 12

-3.2381e-002	1.6917e-001	8.5926e-003	2.6583e-001	8.5926e-003	1.7362e+000
0	0	0	0	0	0
0	0	0	0	0	0
-2.9921e-003	0	0	0	0	0
-9.2063e-004	0	0	0	0	0
-5.0635e-003	0	0	0	0	0
4.8275e-003	0	0	0	0	0
0	5.3857e-002	0	9.3214e-003	-2.9921e-003	0
0	0	2.4550e-003	2.9921e-003	-9.2063e-004	0
0	9.3214e-003	2.9921e-003	5.3857e-002	0	9.3214e-003
0	-2.9921e-003	-9.2063e-004	0	2.4550e-003	2.9921e-003
0	0	0	9.3214e-003	2.9921e-003	3.4081e-001
0	0	0	-2.9921e-003	-9.2063e-004	-5.0635e-003

Column 13
-3.2381e-002
0
0
0
0
0
0
0
0
-2.9921e-003
-9.2063e-004
-5.0635e-003
4.8275e-003
K = 1.0e+006*

Columns 1 through 12

0	0	0	0	0	0	0	0	0	0	0	0
0	3.4805	0	-1.7402	1.1602	0	0	0	0	0	0	0
0	0	2.0625	-1.1602	0.5156	0	0	0	0	0	0	0
0	-1.7402	-1.1602	3.4805	0	-1.7402	1.1602	0	0	0	0	0
0	1.1602	0.5156	0	2.0625	-1.1602	0.5156	0	0	0	0	0
0	0	0	-1.7402	-1.1602	1.7402	-1.1602	0	0	0	0	0
0	0	0	1.1602	0.5156	-1.1602	1.0313	0	0	0	0	0
0	0	0	0	0	0	0	3.4805	0	-1.7402	1.1602	0
0	0	0	0	0	0	0	0	2.0625	-1.1602	0.5156	0
0	0	0	0	0	0	0	0	-1.7402	-1.1602	3.4805	0
0	0	0	0	0	0	0	0	1.1602	0.5156	0	2.0625
0	0	0	0	0	0	0	0	0	-1.7402	-1.1602	0
0	0	0	0	0	0	0	0	0	1.1602	0.5156	0

Column 12	Column 13
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
-1.7402	1.1602
-1.1602	0.5156
1.7402	-1.1602
-1.1602	1.0313

d =

1	2	2
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	2	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	2