ELEN 236 Project 1.2

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Devon Quaternik

Previous work

```
L=1;
J=0.0676;
m=0.9048;
r=0.03;
Jb=0.000326;
g=9.81;
p0=.25;

b=m/[(Jb/r^2)+m];

a=[0 1 0 0; 0 0 -b*g 0; 0 0 0 1; -m*g/(m*p0^2+J+Jb) 0 0 0];
B=[0;0;0;1/(m*p0^2+J+Jb)];
c=[1 0 0 0];
d=0;

sys=ss(a,B,c,d);
```

3.4b

```
% CCF transformation matrix
% Transfer function used to build inverted Pccf matrix
P=ctrb(sys);
[num, den]=ss2tf(a,B,c,d)
Pc1=[0 0 0 1; 0 0 1 0; 0 1 0 0; 1 0 0 0];
Tc=P*Pc1;
Tc1=inv(Tc);

Ac1=Tc1*a;
Ac=Ac1*Tc
Bc=Tc1*B
Cc=c*Tc
Dc=d


num =
```

```
         0         0         0         0  -56.2797
```

```
den =

    1.0000         0    0.0000    0.0000 -499.5435
```

```
Ac =

         0    1.0000         0         0
         0         0    1.0000         0
         0         0         0    1.0000
  499.5435         0         0         0
```

```
Bc =

     0
     0
     0
     1
```

```
Cc =

  -56.2797         0         0         0
```

```
Dc =

     0
```

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