# ELEN 236 Project 1.2

## Table of Contents

# Devon Quaternik

# CE 2.4A

```
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);

impulse(sys)

%Comment on constraints
```
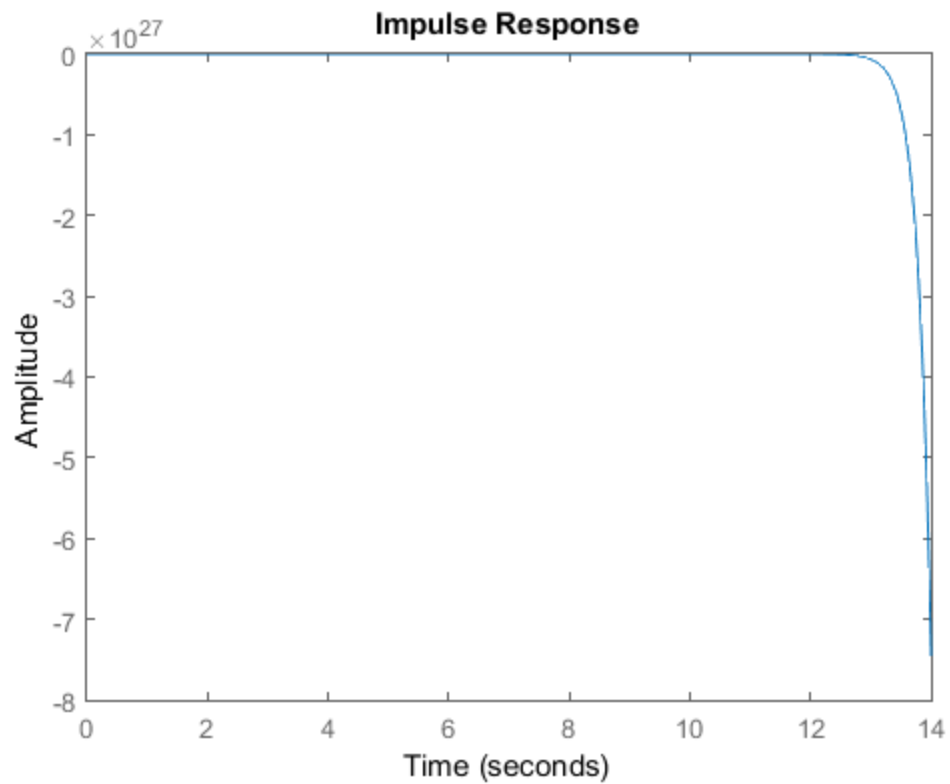
# CE 2.4B

```
[T,lam]=eig(a);

T1=inv(T);

%Diagonal Canonical form for each

a1=T1*a;
Ad=a1*T
Bd=T1*B
Cd=c*T
Dd=d
```

*Ad =*

```
 -4.7276 + 0.0000i    0.0000 + 0.0000i    0.0000 - 0.0000i   -0.0000 -
0.0000i
   0.0000 - 0.0000i   -0.0000 + 4.7276i    0.0000 + 0.0000i    0.0000 -
0.0000i
   0.0000 + 0.0000i    0.0000 - 0.0000i    0.0000 - 4.7276i    0.0000 +
0.0000i
  -0.0000 - 0.0000i    0.0000 - 0.0000i    0.0000 + 0.0000i    4.7276 -
0.0000i
```

```
Bd =

    2.1513 + 0.0000i
    2.1513 + 0.0000i
    2.1513 - 0.0000i
   -2.1513 + 0.0000i


Cd =

   0.0619 + 0.0000i  -0.0000 - 0.0619i  -0.0000 + 0.0619i   0.0619 +
 0.0000i


Dd =

     0
```

# CE 3.4A

```
A2=a*a;
A3=A2*a;
P=[B a*B A2*B A3*B];
y=rank(P);
if y==length(a)
    disp('Controllable');
else
    disp('Not Controllable');
end
```

```
Controllable
```

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