Q5

```matlab
s = tf("s");
Gm = 1/s;
Gs = 1/10/s;
Ge = ((0.16*s^3)+240*s)/((0.008*s^4)+(0.48*s^3)+144*s);
Gh = 1152/((4*s^4)+(48*s^3)+(240*s^2)+576*s+576);

systemnames = 'Gh Gm Gs Ge'; %Block name only
inputvar = '[wh;we;fm;fs]';
outputvar = '[Gm;Gs;Ge]'; %Strangely, the system outputs are just the name
input_to_Gh = '[wh]';
input_to_Gm = '[Gh-fm]';
input_to_Gs = '[Ge-fs]';
input_to_Ge = '[we]';
cleanupsysic = 'yes';  %This drops all the useless variables from workspace
P = sysic;
P_ss = ss(P)
```

```
P_ss =

  A =
          x1      x2      x3      x4      x5      x6       x7       x8      x9      x10      x11      x12     x13     x14
   x1     -12    -7.5    -4.5   -2.25       0       0        0        0       0        0        0        0       0       0
   x2       8       0       0       0       0       0        0        0       0        0        0        0       0       0
   x3       0       4       0       0       0       0        0        0       0        0        0        0       0       0
   x4       0       0       2       0       0       0        0        0       0        0        0        0       0       0
   x5       0       0       0  0.0625       0       0        0        0       0        0        0        0       0       0
   x6       0       0       0       0       0     -60  3.02e-14   -35.16       0        0        0        0       0       0
   x7       0       0       0       0       0      16        0        0       0        0        0        0       0       0
   x8       0       0       0       0       0       0       32        0       0        0        0        0       0       0
   x9       0       0       0       0       0       0        0        1       0        0        0        0       0       0
   x10      0       0       0       0       0       0        0        0       0      -60  3.02e-14   -35.16       0       0
   x11      0       0       0       0       0       0        0        0       0       16        0        0       0       0
   x12      0       0       0       0       0       0        0        0       0        0       32        0       0       0
   x13      0       0       0       0       0       0        0        0       0        0        0        0       0       0
   x14      0       0       0       0       0       0        0        0       0        0        0        0       0       0
```

```matlab
[A,B,C,D] = ssdata(P_ss);
B1 = B(:,1:3) %14x3
```

```
B1 = 14×3
     8     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     8     0
       ⋮
```

```matlab
B2 = B(:,4) %14x1
```

```
B2 = 14×1
     0
     0
     0
     0
     0
     0
     0
     0
     0
     0
       ⋮
```

```matlab
C1 = C(1:2,:) %2x14
```

```
C1 = 2×14
     0     0     0     0  9.0000     0       0     0       0     0     0     0  -1.0000       0
     0     0     0     0       0     0  0.0625     0  2.9297     0     0     0       0  -0.4000
```

```
C2 = C(3,:) %1x14
```

```
C2 = 1×14
        0        0        0        0        0        0        0        0        0   2.5000        0   7.3242        0        0
```

```
D12 = zeros(2,1)
```

```
D12 = 2×1
     0
     0
```

```
D22 = 0
```

```
D22 = 0
```

```
D21 = zeros(1,3)
```

```
D21 = 1×3
     0     0     0
```

D21 is all 0, which make the ARE unsolvable.