OUTPUTS:


```
>>introduction

sys =

  A =
         x1    x2
   x1     0     1
   x2    -1  -0.2

  B =
       u1
   x1   0
   x2   1

  C =
       x1  x2
   y1   1   0

  D =
       u1
   y1   0

Continuous-time state-space model.
Model Properties

sys =

         1
  ----------------
  s^2 + 0.2 s + 1

Continuous-time transfer function.
Model Properties

sys =

         1
  ----------------
  s^2 + 0.2 s + 1

Continuous-time transfer function.
Model Properties
>>
```

```
State-space model:

cruise_ss =

  A =
         x1
   x1  -0.05

  B =
         u1
   x1  0.001

  C =
       x1
   y1   1

  D =
       u1
   y1   0

Continuous-time state-space model.
Model Properties
Transfer function model:

P_cruise =

       1
  ------------
  1000 s + 50

Continuous-time transfer function.
Model Properties
>>
```

```
Continuous-time transfer function.
Model Properties
 State-space model for motor:

 motor_ss =

   A =
          x1      x2
    x1  -5000       1
    x2  -0.02      -2

   B =
        u1
    x1   0
    x2   2

   C =
        x1  x2
    y1   1   0

   D =
        u1
    y1   0

 Continuous-time state-space model.
 Model Properties
 >>
```

```
Transfer function model:

P_cruise =

      1
  ------------
  1000 s + 50

Continuous-time transfer function.
Model Properties
State-space model for motor:

motor_ss =

  A =
         x1     x2
   x1  -5000      1
   x2  -0.02     -2

  B =
       u1
   x1   0
   x2   2

  C =
       x1  x2
   y1   1   0

  D =
       u1
   y1   0

Continuous-time state-space model.
Model Properties
>> Motor_speed
Transfer function model:

P_cruise =

      1
  ------------
  1000 s + 50

Continuous-time transfer function.
Model Properties
State-space model for motor:

motor_ss =
```

```
  A =
         x1     x2
   x1  -5000      1
   x2  -0.02     -2

  B =
       u1
   x1   0
   x2   2

  C =
       x1  x2
   y1   1   0

  D =
       u1
   y1   0

Continuous-time state-space model.
Model Properties
>> Motor_Position

P_motor =

                  0.0274
  ---------------------------------------------
  8.878e-12 s^3 + 1.291e-05 s^2 + 0.0007648 s

Continuous-time transfer function.
Model Properties

motor_ss =

  A =
              x1          x2          x3
   x1           0           1           0
   x2           0      -1.087        8487
   x3           0       -9964  -1.455e+06

  B =
             u1
   x1         0
   x2         0
   x3  3.636e+05

  C =
       x1  x2  x3
   y1   1   0   0
```

```
  D =
       u1
   y1   0

Continuous-time state-space model.
Model Properties
>> Motor_Position

P_motor =

                   0.0274
  ---------------------------------------------
  8.878e-12 s^3 + 1.291e-05 s^2 + 0.0007648 s

Continuous-time transfer function.
Model Properties

motor_ss =

  A =
               x1           x2           x3
   x1           0            1            0
   x2           0       -1.087         8487
   x3           0        -9964   -1.455e+06

  B =
              u1
   x1          0
   x2          0
   x3   3.636e+05

  C =
       x1  x2  x3
   y1   1   0   0

  D =
       u1
   y1   0

Continuous-time state-space model.
Model Properties
>>
```

```
>>  suspension
Transfer function G1:

G1 =

                 2820 s^2 + 15020 s + 500000
  ------------------------------------------------------------
  800000 s^4 + 3.854e07 s^3 + 1.481e09 s^2 + 1.377e09 s + 4e10

Continuous-time transfer function.
Model Properties
Transfer function G2:

G2 =

                 -3.755e07 s^3 - 1.25e09 s^2
  ------------------------------------------------------------
  800000 s^4 + 3.854e07 s^3 + 1.481e09 s^2 + 1.377e09 s + 4e10

Continuous-time transfer function.
Model Properties
>>
```

```
>> Inverted_pendulum

sys_tf =

  From input "u" to output...
                      4.182e-06 s^2 - 0.0001025
   x:  ------------------------------------------------------------------------
       2.3e-06 s^4 + 4.182e-07 s^3 - 7.172e-05 s^2 - 1.025e-05 s

                               1.045e-05 s
   phi:  ---------------------------------------------------------------------
         2.3e-06 s^3 + 4.182e-07 s^2 - 7.172e-05 s - 1.025e-05

Continuous-time transfer function.
Model Properties

sys_ss =

  A =
                 x    x_dot      phi   phi_dot
   x             0        1        0         0
   x_dot         0  -0.1818    2.673         0
   phi           0        0        0         1
   phi_dot       0  -0.4545    31.18         0

  B =
                u
   x            0
   x_dot    1.818
   phi          0
   phi_dot  4.545

  C =
              x    x_dot      phi   phi_dot
   x          1        0        0         0
   phi        0        0        1         0

  D =
        u
   x    0
   phi  0

Continuous-time state-space model.
Model Properties

sys_tf_ss =
```

```
  From input "u" to output...
          1.818 s^2 + 4.845e-15 s - 44.55
   x:  ------------------------------------------------------------
       s^4 + 0.1818 s^3 - 31.18 s^2 - 4.455 s

                 4.545 s - 7.774e-16
   phi:  ---------------------------------------------
         s^3 + 0.1818 s^2 - 31.18 s - 4.455

Continuous-time transfer function.
Model Properties
>>
```

```
>> Aircraft_pitch

pitch_ss =

  A =
           x1       x2       x3
   x1   -0.313     56.7        0
   x2  -0.0139   -0.426        0
   x3        0     56.7        0

  B =
          u1
   x1   0.232
   x2  0.0203
   x3       0

  C =
       x1  x2  x3
   y1   0   0   1

  D =
       u1
   y1   0

Continuous-time state-space model.
Model Properties

P_pitch =

      1.151 s + 0.1774
  ----------------------------
  s^3 + 0.739 s^2 + 0.921 s

Continuous-time transfer function.
Model Properties
>>
```

```
P_ball =

  0.21
  ----
  s^2

Continuous-time transfer function.
Model Properties

ball_ss =

  A =
       x1  x2  x3  x4
   x1   0   1   0   0
   x2   0   0   7   0
   x3   0   0   0   1
   x4   0   0   0   0

  B =
       u1
   x1   0
   x2   0
   x3   0
   x4   1

  C =
       x1  x2  x3  x4
   y1   1   0   0   0

  D =
       u1
   y1   0

Continuous-time state-space model.
Model Properties
>>
```