```
>> Trim_f18fullDU_a_Edits

statenames =

    'V (ft/s)'
    'Beta (rad)'
    'Alpha (rad)'
    'Roll Rate (rad/s)'
    'Pitch Rate (rad/s)'
    'Yaw Rate (rad/s)'
    'Phi (rad)'
    'Theta (rad)'
    'Yaw (rad)'
    'pN (ft)'
    'pE (ft)'
    'h (ft)'


inputnames =
```

```
    'Aileron (rad)'
    'Rudder (rad)'
    'Stabilator (rad)'
    'T (lbf)'

initial values

ans =

   500


ans =

     0
    10
     0
     0
```

```
     0
     0
    10
     0


ans =

     0
     0


ans =

       35000


ans =
```

```
     0
     0
     0


ans =

        6000

Warning: The command linoptions is↙
obsolete. Use linearizeOptions or↙
findopOptions instead.
> In linoptions (line 131)
  In Trim_f18fullDU_a_Edits (line↙
157)

Local minimum found that satisfies↙
the constraints.
```

Optimization completed because the↙
objective function is non-decreasing↙
in
feasible directions, to within the↙
default value of the function↙
tolerance,
and constraints are satisfied to↙
within the default value of the↙
constraint tolerance.

<stopping criteria details>

Operating Point Search Report:

Operating Report for the Model↙
f18full_DUtrim.
(Time-Varying Components Evaluated↙

```
at time t=0)

Operating point specifications were↙
successfully met.
States:
----------
(1.) f18full_DUtrim/Integrator a1
      x:              436      dx:↙
1.05e-08 (0)
(2.) f18full_DUtrim/Integrator a2
      x:                0      dx:↙
0 (0)
(3.) f18full_DUtrim/Integrator a3
      x:            0.175      dx:↙
-2.69e-07 (0)
(4.) f18full_DUtrim/Integrator b1
      x:                0      dx:↙
0 (0)
(5.) f18full_DUtrim/Integrator b2
```

```
      x:                0      dx:↙
-6.09e-09 (0)
(6.) f18full_DUtrim/Integrator b3
      x:                0      dx:↙
0 (0)
(7.) f18full_DUtrim/Integrator c1
      x:                0      dx:↙
0 (0)
(8.) f18full_DUtrim/Integrator c2
      x:            0.175      dx:↙
0 (0)
(9.) f18full_DUtrim/Integrator c3
      x:                0      dx:↙
0 (0)
(10.) f18full_DUtrim/Integrator d1
      x:                0      dx:↙
436
(11.) f18full_DUtrim/Integrator d2
      x:                0      dx:↙
```

```
0
(12.) f18full_DUtrim/Integrator d3
      x:        3.5e+04      dx:↙
-1.42e-14

Inputs:
----------
(1.) f18full_DUtrim/dAil
      u:              0    [-Inf Inf]
(2.) f18full_DUtrim/dRud
      u:              0    [-Inf Inf]
(3.) f18full_DUtrim/dStab
      u:         -0.022    [-Inf Inf]
(4.) f18full_DUtrim/T
      u:       5.47e+03    [0 3.8↙
e+04]

Outputs:
----------
```

```
(1.) f18full_DUtrim/V
      y:             436    [-Inf Inf]
(2.) f18full_DUtrim/beta
      y:               0    [-Inf Inf]
(3.) f18full_DUtrim/alpha
      y:           0.175    [-Inf Inf]
(4.) f18full_DUtrim/p
      y:               0    [-Inf Inf]
(5.) f18full_DUtrim/q
      y:               0    [-Inf Inf]
(6.) f18full_DUtrim/r
      y:               0    [-Inf Inf]
(7.) f18full_DUtrim/phi
      y:               0    [-Inf Inf]
(8.) f18full_DUtrim/theta
      y:           0.175    [-Inf Inf]
(9.) f18full_DUtrim/psi
      y:               0    [-Inf Inf]
(10.) f18full_DUtrim/pN
```

```
      y:                0    [-Inf Inf]
(11.) f18full_DUtrim/pE
      y:                0    [-Inf Inf]
(12.) f18full_DUtrim/h
      y:          3.5e+04    [-Inf Inf]

      Model: 'f18full_DUtrim'
     States: [12x1 opcond.↙
StatePoint]
     Inputs: [4x1 opcond.InputPoint]
       Time: 0
    Version: 2


x_trim =

   1.0e+04 *

    0.0436
```

```
         0
    0.0000
         0
         0
         0
         0
    0.0000
         0
    3.5000


u_trim =

   1.0e+03 *

         0
         0
   -0.0000
    5.4705
```

```
Trimmed Value

ans =

   435.9226


ans =

     0
    10
     0
     0
     0
     0
    10
     0
```

```
ans =

       35000


ans =

           0
           0
   -1.2616


ans =

   5.4705e+03

Warning: Model 'f18full_DUtrim' is↙
using a default value of 0.2 for↙
```

```
maximum step size. You can disable↙
this diagnostic by
setting 'Automatic solver parameter↙
selection' diagnostic to 'none' in↙
the Diagnostics page of the↙
configuration
parameters dialog
> In dlinmod (line 195)
  In linmod (line 59)
  In Trim_f18fullDU_a_Edits (line↙
203)
Warning: Extra states are being set↙
to zero.
> In DAStudio.warning (line 28)
  In dlinmod (line 217)
  In linmod (line 59)
  In Trim_f18fullDU_a_Edits (line↙
203)
```

```
A_longltrl =

   -0.0239  -28.3166         0↙
-32.2000         0         0↙
0         0
   -0.0003   -0.3621    1.0000↙
0         0         0         0↙
0
   -0.0000   -2.2115   -0.2532↙
0         0         0         0↙
0
         0         0    1.0000↙
0         0         0         0↙
0
         0         0         0↙
0   -0.0374    0.1736   -0.9848↙
0.0727
         0         0         0↙
0   -8.5429   -0.8883    0.8762↙
```

```
0
         0         0         0↙
0    0.8860    0.0399   -0.1895↙
0
         0         0         0↙
0         0    1.0000    0.1763↙
0


B_longltrl =

    0.0010   -3.8114         0↙
0
   -0.0000   -0.0515         0↙
0
         0   -2.8791         0↙
0
         0         0         0↙
0
```

```
         0         0   -0.0149↙
0.0207
         0         0    8.3320↙
0.9541
         0         0   -0.0420↙
-0.6277
         0         0         0↙
0
```

```
C_longltrl =

     1     0     0     0     0     0↙
0     0
     0     1     0     0     0     0↙
0     0
     0     0     1     0     0     0↙
0     0
     0     0     0     1     0     0↙
```

```
0     0
     0     0     0     0     1     0↙
0     0
     0     0     0     0     0     1↙
0     0
     0     0     0     0     0     0↙
1     0
     0     0     0     0     0     0↙
0     1
```

```
D_longltrl =

     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
```

```
     0     0     0     0
     0     0     0     0


A_longltrl9 =

   -0.0239  -28.3166         0↙
-32.2000         0         0↙
0         0         0
   -0.0003   -0.3621    1.0000↙
0         0         0         0↙
0         0
   -0.0000   -2.2115   -0.2532↙
0         0         0         0↙
0         0
         0         0    1.0000↙
0         0         0         0↙
0         0
         0 -435.9226         0↙
```

```
435.9226         0         0↙
0         0         0
         0         0         0↙
0         0   -0.0374    0.1736↙
-0.9848    0.0727
         0         0         0↙
0         0   -8.5429   -0.8883↙
0.8762         0
         0         0         0↙
0         0    0.8860    0.0399↙
-0.1895         0
         0         0         0↙
0         0         0    1.0000↙
0.1763         0
```

```
B_longltrl9 =

    0.0010   -3.8114         0↙
```

```
0
   -0.0000   -0.0515         0↙
0
         0   -2.8791         0↙
0
         0         0         0↙
0
         0         0         0↙
0
         0         0   -0.0149↙
0.0207
         0         0    8.3320↙
0.9541
         0         0   -0.0420↙
-0.6277
         0         0         0↙
0
```

```
C_longltrl9 =

     1     0     0     0     0     0↙
0     0     0
     0     1     0     0     0     0↙
0     0     0
     0     0     1     0     0     0↙
0     0     0
     0     0     0     1     0     0↙
0     0     0
     0     0     0     0     1     0↙
0     0     0
     0     0     0     0     0     1↙
0     0     0
     0     0     0     0     0     0↙
1     0     0
     0     0     0     0     0     0↙
0     1     0
     0     0     0     0     0     0↙
```

```
0     0     1
```

```
D_longltrl9 =

     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
```

```
Longitudnal states: [V alpha q theta↙
]
Longitudinal controls [ T  d_STAB]
```

```
A_x =

   -0.0239  -28.3166         0↙
-32.2000
   -0.0003   -0.3621    1.0000↙
0
   -0.0000   -2.2115   -0.2532↙
0
         0         0    1.0000↙
0


B_x =

    0.0010   -3.8114
   -0.0000   -0.0515
         0   -2.8791
         0         0
```

```
Longitudnal states: [V alpha q theta↙
h ]
Longitudinal controls [ T  d_STAB]

A5_x =

   -0.0239  -28.3166         0↙
-32.2000         0
   -0.0003   -0.3621    1.0000↙
0         0
   -0.0000   -2.2115   -0.2532↙
0         0
         0         0    1.0000↙
0         0
         0 -435.9226         0↙
435.9226         0


B5_x =
```

```
    0.0010   -3.8114
   -0.0000   -0.0515
         0   -2.8791
         0         0
         0         0

Lateral states: [beta p r phi]
Lateral controls [ d_AIL  d_RUD]

A_y =

   -0.0374    0.1736   -0.9848↙
0.0727
   -8.5429   -0.8883    0.8762↙
0
    0.8860    0.0399   -0.1895↙
0
         0    1.0000    0.1763↙
```

```
0


B_y =

   -0.0149    0.0207
    8.3320    0.9541
   -0.0420   -0.6277
         0         0

eigenvalues of A_longltrl

ans =

  -0.3094 + 1.4799i
  -0.3094 - 1.4799i
  -0.0101 + 0.1008i
  -0.0101 - 0.1008i
  -0.2873 + 1.4530i
```

```
  -0.2873 - 1.4530i
  -0.4888 + 0.0000i
  -0.0518 + 0.0000i

eigenvalues of A_longltrl9

ans =

   0.0000 + 0.0000i
  -0.3094 + 1.4799i
  -0.3094 - 1.4799i
  -0.0101 + 0.1008i
  -0.0101 - 0.1008i
  -0.2873 + 1.4530i
  -0.2873 - 1.4530i
  -0.4888 + 0.0000i
  -0.0518 + 0.0000i

eigenvalues of A_x
```

```
ans =

  -0.3094 + 1.4799i
  -0.3094 - 1.4799i
  -0.0101 + 0.1008i
  -0.0101 - 0.1008i

eigenvalues of A5_x

ans =

   0.0000 + 0.0000i
  -0.3094 + 1.4799i
  -0.3094 - 1.4799i
  -0.0101 + 0.1008i
  -0.0101 - 0.1008i

eigenvalues of A_y
```

```
ans =

  -0.2873 + 1.4530i
  -0.2873 - 1.4530i
  -0.4888 + 0.0000i
  -0.0518 + 0.0000i

>> Sate_variables
Trimmed States (x_trim):
   1.0e+04 *

    0.0436
         0
    0.0000
         0
         0
         0
         0
```

```
    0.0000
         0
    3.5000

Trimmed Inputs (u_trim):
   1.0e+03 *

         0
         0
   -0.0000
    5.4705

Trimmed Airspeed (V): 435.92 ft/s
Trimmed Alpha (Angle of Attack):↙
10.00 deg
Trimmed Theta (Pitch Angle): 10.00↙
deg
Trimmed Altitude (h): 35000.00 ft
Trimmed Thrust: 5470.45 lbf
```

```
Trimmed Stabilator Deflection: -1.26↙
deg
Warning: Model 'f18full_DUtrim' is↙
using a default value of 0.2 for↙
maximum step size. You can disable↙
this diagnostic
by setting 'Automatic solver↙
parameter selection' diagnostic to↙
'none' in the Diagnostics page of↙
the configuration
parameters dialog
> In dlinmod (line 195)
  In linmod (line 59)
  In Sate_variables (line 18)
Warning: Extra states are being set↙
to zero.
> In DAStudio.warning (line 28)
  In dlinmod (line 217)
  In linmod (line 59)
```

In Sate_variables (line 18)

Perturbed A Matrix:

```
   -0.0246         0  -30.0257↙
0          0         0         0↙
-32.2000         0         0↙
0          0
         0   -0.0377         0↙
0.1754         0   -0.9845    0.0720↙
0          0         0         0↙
0
   -0.0003         0   -0.3639↙
0    1.0000         0         0↙
0.0000         0         0         0↙
0
         0   -8.7564         0↙
-0.8960         0    0.8870↙
0          0         0         0↙
0          0
   -0.0000         0   -2.2626↙
```

```
0   -0.2566         0         0↙
0         0         0         0↙
0
         0    0.9029         0↙
0.0403         0   -0.1915         0↙
0         0         0         0↙
0
         0         0         0↙
1.0000         0    0.1781         0↙
0         0         0         0↙
0
         0         0         0↙
0    1.0000         0         0↙
0         0         0         0↙
0
         0         0         0↙
0         0    1.0157         0↙
0         0         0         0↙
0
```

```
    1.0000         0         0↙
0         0         0         0↙
0         0         0         0↙
0
         0  440.2819         0↙
0         0         0  -77.2108↙
0  440.2819         0         0↙
0
    0.0000         0 -440.2819↙
0         0         0         0↙
440.2819         0         0↙
0         0

Perturbed B Matrix:
         0         0   -3.9477↙
0.0010
   -0.0150    0.0209         0↙
0
         0         0   -0.0519↙
```

```
-0.0000
    8.4847    0.9733         0↙
0
         0         0   -2.9370↙
0
   -0.0431   -0.6387         0↙
0
         0         0         0↙
0
         0         0         0↙
0
         0         0         0↙
0
         0         0         0↙
0
         0         0         0↙
0
         0         0         0↙
0
```

Perturbed C Matrix:

```
     1     0     0     0     0     0↙
0     0     0     0     0     0
     0     1     0     0     0     0↙
0     0     0     0     0     0
     0     0     1     0     0     0↙
0     0     0     0     0     0
     0     0     0     1     0     0↙
0     0     0     0     0     0
     0     0     0     0     1     0↙
0     0     0     0     0     0
     0     0     0     0     0     1↙
0     0     0     0     0     0
     0     0     0     0     0     0↙
1     0     0     0     0     0
     0     0     0     0     0     0↙
0     1     0     0     0     0
     0     0     0     0     0     0↙
```

```
0     0     1     0     0     0
     0     0     0     0     0     0↙
0     0     0     1     0     0
     0     0     0     0     0     0↙
0     0     0     0     1     0
     0     0     0     0     0     0↙
0     0     0     0     0     1
```

Perturbed D Matrix:

```
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
     0     0     0     0
```

```
     0     0     0     0
     0     0     0     0

Perturbed A Matrix Reduced:
   -0.0246         0  -30.0257↙
0         0         0         0↙
-32.2000
         0   -0.0377         0↙
0.1754         0   -0.9845    0.0720↙
0
   -0.0003         0   -0.3639↙
0    1.0000         0         0↙
0.0000
         0   -8.7564         0↙
-0.8960         0    0.8870↙
0         0
   -0.0000         0   -2.2626↙
0   -0.2566         0         0↙
0
```

```
         0    0.9029         0↙
0.0403         0   -0.1915         0↙
0

         0         0         0↙
1.0000         0    0.1781         0↙
0

         0         0         0↙
0    1.0000         0         0↙
0
```

Perturbed B Matrix Reduced:

```
         0         0   -3.9477↙
0.0010
   -0.0150    0.0209         0↙
0

         0         0   -0.0519↙
-0.0000
    8.4847    0.9733         0↙
0
```

```
         0         0   -2.9370↙
0
   -0.0431   -0.6387         0↙
0
         0         0         0↙
0
         0         0         0↙
0

Norm of Delta A: 61.6193
Norm of Delta B: 9.7781
Longitudinal Modes:
        Eigenvalue↙
Damping_Ratio     Frequency_rad_s
    ____________________↙
_______________    ____________________

     -0.30945+1.4799i              1↙
-0.051833+0i
```

```
     -0.30945-1.4799i      0.10005↙
-0.010132+0.10077i
    -0.010132+0.10077i     0.10005↙
-0.010132-0.10077i
    -0.010132-0.10077i           1↙
-0.48877+0i
     -0.28732+1.453i       0.19399↙
-0.28732+1.453i
     -0.28732-1.453i       0.19399↙
-0.28732-1.453i
     -0.48877+0i           0.20468↙
-0.30945+1.4799i
    -0.051833+0i           0.20468↙
-0.30945-1.4799i

Lateral Modes:
       Eigenvalue↙
Damping_Ratio    Frequency_rad_s
    ___________________↙
```

```
_____________    ___________________

     -0.28732+1.453i           1↙
-0.051833+0i
     -0.28732-1.453i           1↙
-0.48877+0i
     -0.48877+0i         0.19399↙
-0.28732+1.453i
    -0.051833+0i         0.19399↙
-0.28732-1.453i

Longitudinal Modes with Periods:
      Nat_Freq_rad_s↙
Damping_Ratio    Damped_Freq_rad_s↙
Period_s
    ____________________↙
_____________    ____________________↙
_________________
```

```
    -0.051833+0i                  1↙
0+0i                -Inf+0i
    -0.010132+0.10077i    0.10005↙
-0.010082+0.10026i     -6.2382-62.04↙
i
    -0.010132-0.10077i    0.10005↙
-0.010082-0.10026i     -6.2382+62.↙
04i
     -0.48877+0i                  1↙
0+0i                -Inf+0i
     -0.28732+1.453i      0.19399↙
-0.28186+1.4254i      -0.8389-4.2423↙
i
     -0.28732-1.453i      0.19399↙
-0.28186-1.4254i      -0.8389+4.↙
2423i
     -0.30945+1.4799i     0.20468↙
-0.3029+1.4485i     -0.86903-4.1559i
     -0.30945-1.4799i     0.20468↙
```

-0.3029-1.4485i -0.86903+4.1559i

Lateral Modes with Periods:

Nat_Freq_rad_s↙

Damping_Ratio Damped_Freq_rad_s↙

Period_s

_____↙

_____ _____↙

_____

-0.051833+0i 1↙

0+0i -Inf+0i

-0.48877+0i 1↙

0+0i -Inf+0i

-0.28732+1.453i 0.19399↙

-0.28186+1.4254i -0.8389-4.2423i

-0.28732-1.453i 0.19399↙

-0.28186-1.4254i -0.8389+4.2423i

```
Warning: Using only the real↙
component of complex data.
> In getRealData (line 43)
  In scatter (line 57)
  In Sate_variables (line 87)
Warning: Using only the real↙
component of complex data.
> In getRealData (line 43)
  In scatter (line 57)
  In Sate_variables (line 88)
>> controller_for_open_loop_trim
Trimmed States (x_trim):
   1.0e+04 *

    0.0436
         0
    0.0000
         0
         0
```

```
         0
         0
    0.0000
         0
    3.5000

Trimmed Inputs (u_trim):
   1.0e+03 *

         0
         0
   -0.0000
    5.4705

Trimmed Airspeed (V): 435.92 ft/s
Trimmed Alpha (Angle of Attack):↙
10.00 deg
Trimmed Theta (Pitch Angle): 10.00↙
deg
```

```
Trimmed Altitude (h): 35000.00 ft
Trimmed Thrust: 5470.45 lbf
Trimmed Stabilator Deflection: -1.26↙
deg
New Longitudinal Eigenvalues:
   -8.0000
   -7.0000
   -6.0000
   -1.0000
   -5.0000
   -2.0000
   -3.0000
   -4.0000

New Lateral Eigenvalues:
   -1.0000
   -4.0000
   -2.0000
   -3.0000
```

```
Longitudinal Mode Step Response and↙
Eigenvalues Adjusted.
Lateral Mode Step Response and↙
Eigenvalues Adjusted.
Longitudinal Mode:
Frequencies (Hz):
Periods (s):
Lateral Mode:
Frequencies (Hz):
Periods (s):
>>
```