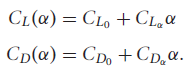
..\2\_PropulsionFix+CL,DalphaFix\

* Uses **Va, alpha, beta** in body frame
* Uses **full propulsion equations** mentioned in the errata
* Until this case file, in all the previous test cases included in the folders—

..\ e\_version\**4\_fm**\testcases\**1\_VaAlphaBeta\_bodyframe**

.. \e\_version\**4\_fm**\testcases\**2\_VaAlphaBeta\_inertialframe**

The expressions used in the ‘**forces\_moments.m’** file for calculating CLalpha & CDalpha was flawed wherein I have simply substituted C\_L\_alpha & C\_D\_alpha respectively in C\_X\_alpha expression. From this test folder onwards, I have corrected it using—



This correction has resolved so many issues.

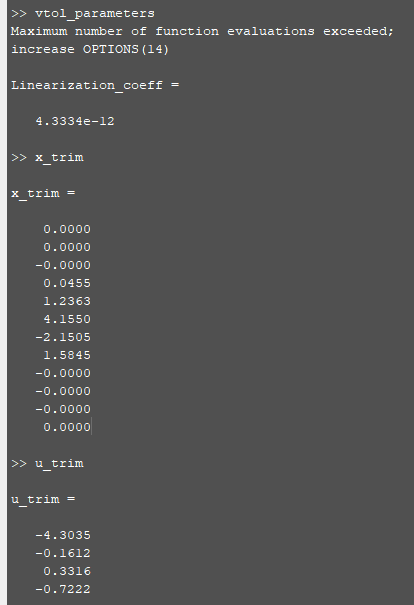
Case 1

* vtol\_parameters.m

**vtol.Va0 = 1;**

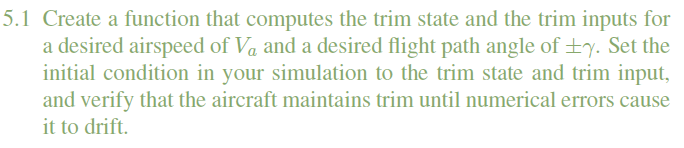
gamma = 0\*pi/180;

R = Inf;



**Observations**

* At very low velocities like this (1 m/s), trimming algorithm cannot hold the aircraft to desired path for too long. I think since the values that are desired to be maintained constant are so low that the numerical errors become significant and the system becomes unstable too soon.
* ‘Va’ errors are significant beyond 40 seconds.
* Look at this to convince yourself that after a certain while, due to numerical errors, the deviations start kicking in. Hence the results are as expected. Trimming cannot hold parameters constant forever.



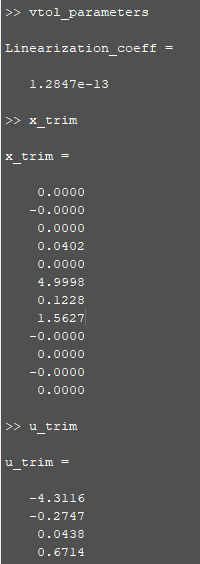
Case 2

* vtol\_parameters.m

**vtol.Va0 = 5;**

gamma = 0\*pi/180;

R = Inf;



**Observations**

* At 5 m/s, trimming does slightly better than at 1 m/s.
* ‘Va’ errors are significant beyond 60 seconds.

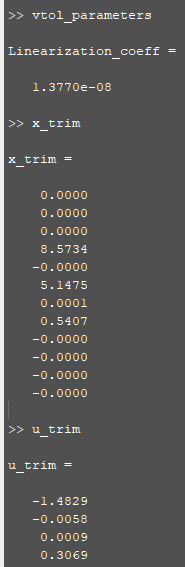
Case 3

* vtol\_parameters.m

**vtol.Va0 = 10;**

gamma = 0\*pi/180;

R = Inf;



**Observations**

* This case does not fit my assumption in cases 1, 2 that at higher velocities, trimming can hold ‘Va’ constant for much longer. Because though 10 m/s is higher than 5 m/s, Va stays constant for only about 40s.

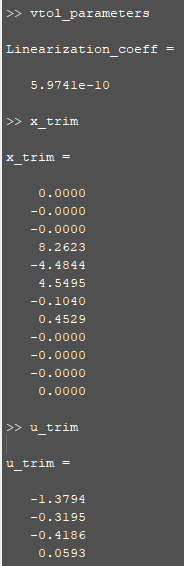
Case 4

* vtol\_parameters.m

vtol.Va0 = 10;

**gamma = 5\*pi/180;**

R = Inf;



**Observations**

* Drifts after about 50s.

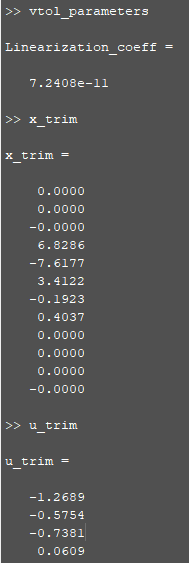
Case 5

* vtol\_parameters.m

vtol.Va0 = 10;

**gamma = 10\*pi/180;**

R = Inf;



**Observations**

* Drifts after about 60s.
* But there is a lot of movement in E-W direction.

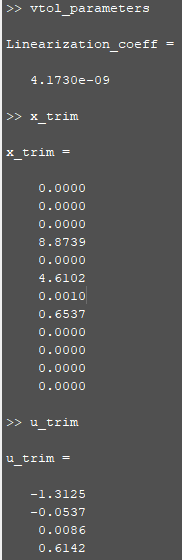
Case 6

* vtol\_parameters.m

vtol.Va0 = 10;

**gamma = -10\*pi/180;**

R = Inf;



**Observations**

* Drifts after about 48s.
* Don’t know why in case of **gamma = 10 rad (case5)**, E-W movement was huge but in case of **gamma = -10 (case6)**, this movement is regulated much better.

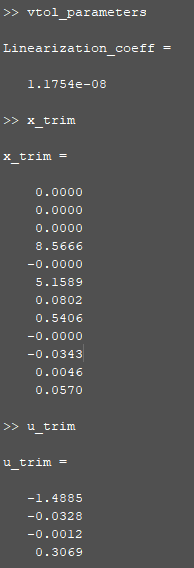
Case 7

* vtol\_parameters.m

vtol.Va0 = 10;

**gamma = 0\*pi/180;**

**R = 150;**



**Observations**

* fff

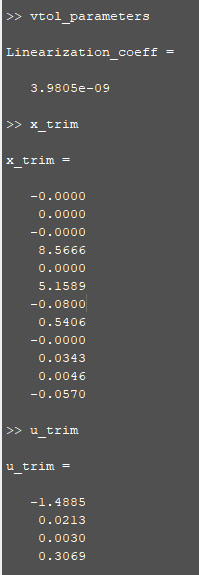
Case 8

* vtol\_parameters.m

vtol.Va0 = 10;

gamma = 0\*pi/180;

**R = -150;**



**Observations**

* fff

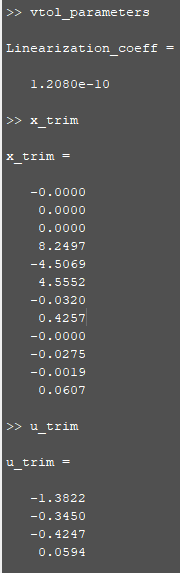
Case 9

* vtol\_parameters.m

vtol.Va0 = 10;

**gamma = 5\*pi/180;**

**R = 150;**



**Observations**

* fff

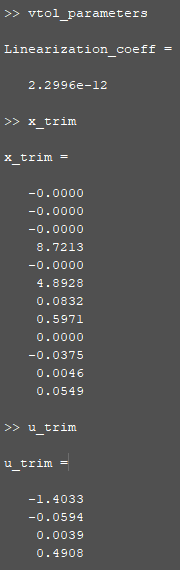
Case 10

* vtol\_parameters.m

vtol.Va0 = 10;

**gamma = -5\*pi/180;**

**R = 150;**



**Observations**

* fff

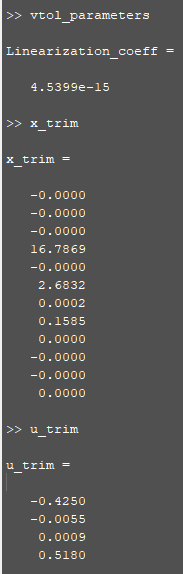
Case 11

* vtol\_parameters.m

**vtol.Va0 = 17;**

gamma = 0\*pi/180;

R = Inf;



**Observations**

* fff

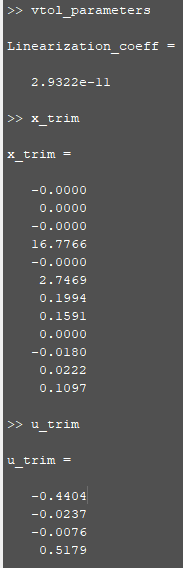
Case 12

* vtol\_parameters.m

vtol.Va0 = 17;

gamma = 0\*pi/180;

**R = 150;**



**Observations**

* fff

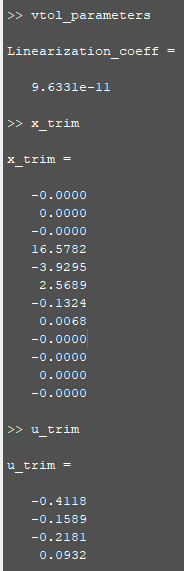
Case 13

* vtol\_parameters.m

vtol.Va0 = 17;

**gamma = 10\*pi/180;**

**R = Inf;**



**Observations**

* fff

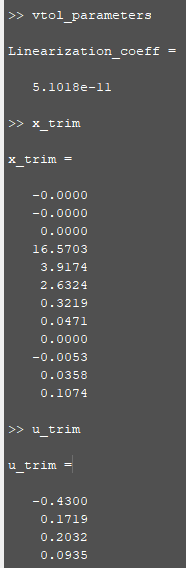
Case 14

* vtol\_parameters.m

vtol.Va0 = 17;

**gamma = 10\*pi/180;**

**R = 150;**



**Observations**

* fff

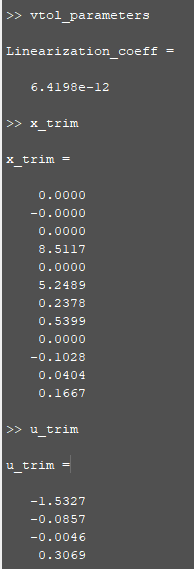
Case 15 (Textbook Design Project 5.5)

* vtol\_parameters.m

vtol.Va0 = 10;

gamma = 0\*pi/180;

**R = 50;**



**Observations**

* fff