

IOD Exercises

Exercise 1 – Implement a Longitudinal Trim and map to the Hat Switch

Outline of steps:

- Modify *FlightControl.cpp* to add a longitudinal trim input (Pilot_LonStickTrim) to the horizontal tail deflection
- Save and rebuild the solution
- Map the longitudinal trim input to the hat switch on the flight stick; provide the capability to both increase and decrease the trim input

Exercise 2 – Implement a longitudinal trim reset switch

Outline of steps:

- Create an event that sets the longitudinal trim input to zero when pressed.
- Assign this event to a button on the flight stick

Exercise 3 – Implement a longitudinal trim input limiter using a script event

Outline of steps:

- Create a script that limits the longitudinal trim input to ± 5 deg
- Syntax hint:

```
if (Pilot_LonStickTrim>5) {  
Pilot_LonStickTrim=5;  
}  
if (Pilot_LonStickTrim<-5) {  
Pilot_LonStickTrim=-5;  
}
```
- Create an event that constantly monitors (and limits) the trim input value during a run. (Hint: Sim Step)

Exercise 4 – Implement the longitudinal trim input limiter in code rather than in script

Outline of steps:

- Remove the script event limit
- Modify *FlightControl.cpp* to add code the limits the trim input to ± 5 deg.

```
Pilot_LonStickTrim = min(max(-5.0, Pilot_LonStickTrim), 5.0f);
```

- Save and rebuild the solution

Exercise 5 – Map Pilot’s Flap Lever to Flight Stick

Outline of steps:

- Modify *flightControl.cpp* to replace the code that sets discrete flap positions of 0, 15, 35 based on the DTEF_Mode
- Save and rebuild the solution
- Create a “manual” flap lever using two buttons on the flight stick to set the flap position in a continuous fashion

Overdrive Exercise

Exercise 1 – Overdrive the simulation using a longitudinal doublet input

Outline of steps:

- Run the sim and manually create a longitudinal doublet using the flight stick.
- Save the time history.
- Extract the longitudinal input from the full save set of variables (include D6Time) and save. Hint: Use Open -> TimeHistory, Cross-Reference
- Run the simulation using the extracted longitudinal doublet input.

Exercise 2 – Determine an alternate method for capturing the longitudinal doublet

Outline of steps:

- Create a longitudinal doublet without using TimeHistory, Cross-Reference (Hint: Stored Variables)
- Run the simulation using the extracted longitudinal doublet input.

Exercise 3 – Overdrive the simulation using a longitudinal doublet input for different weights or CGs

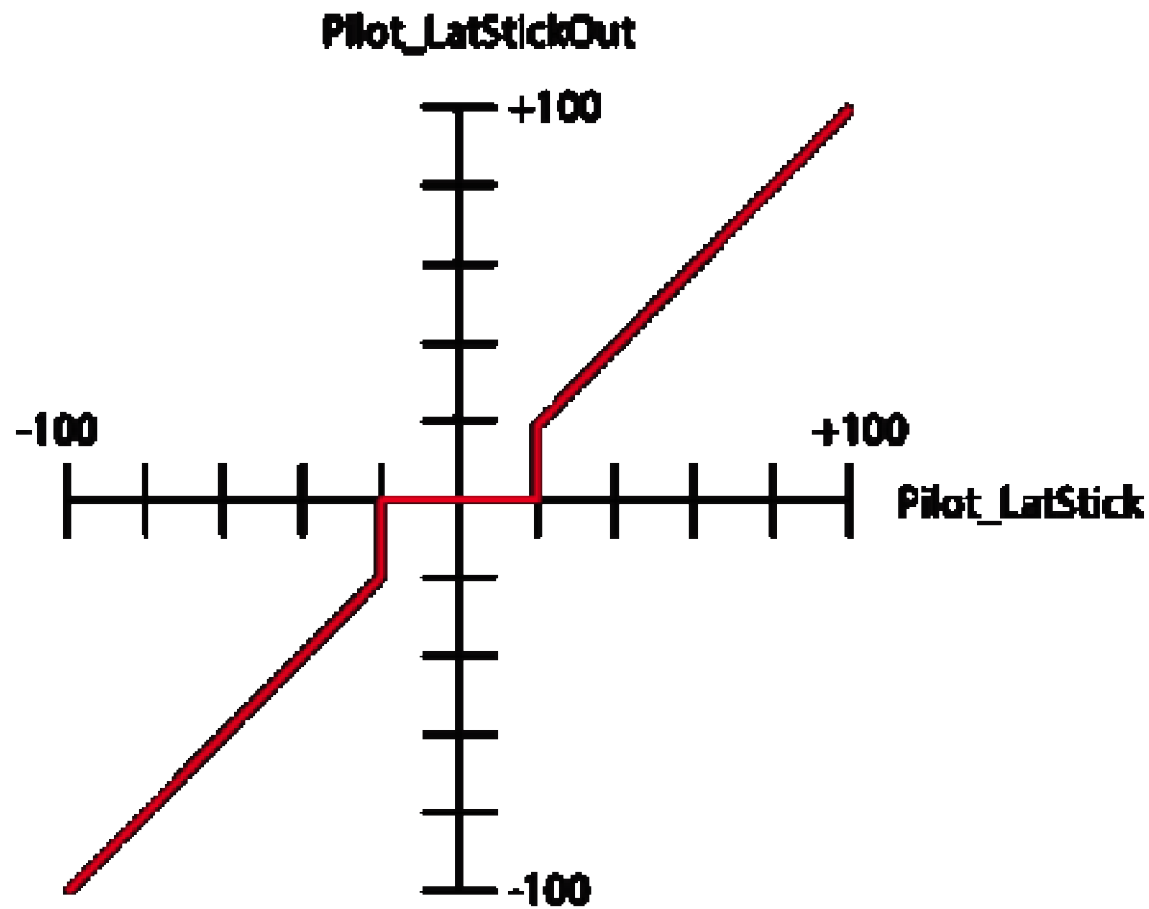
Outline of steps:

- Change the weight or CG of the aircraft
- Run the simulation using the extracted longitudinal doublet input.
- Overplot the results and compare



Flight Simulation Environment

Exercise 6 – Create a lateral stick deadband



Exercise 6 – Create a lateral stick deadband

Outline of steps:

- Create a data table that has Pilot_LatStick as the independent variable and Pilot_LatStickOut as the dependent variable
- Modify *FlightControl.cpp* to add the table lookup and to use Pilot_LatStickOut. Save & recompile the sim.
- Use InfoFile to import the deadband data table; build tables; save sim.
- Run the sim and monitor Pilot_LatStickOut and Pilot_LatStick