

## Pieter P

## Model

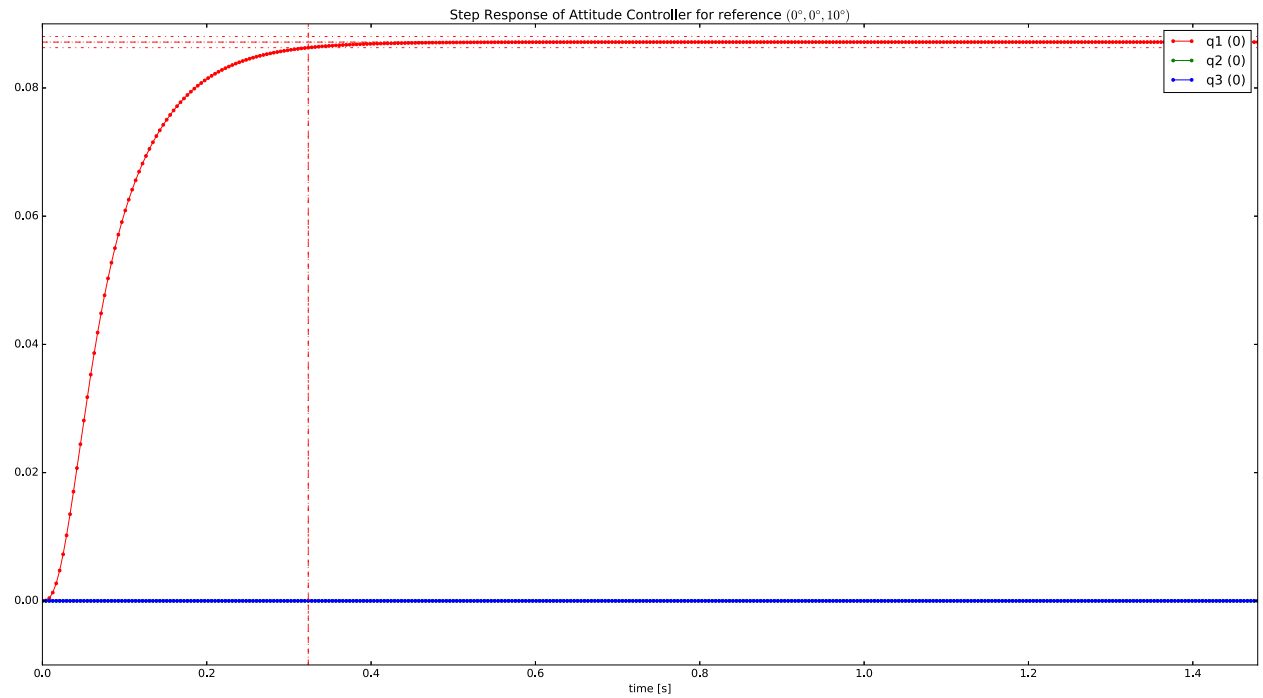
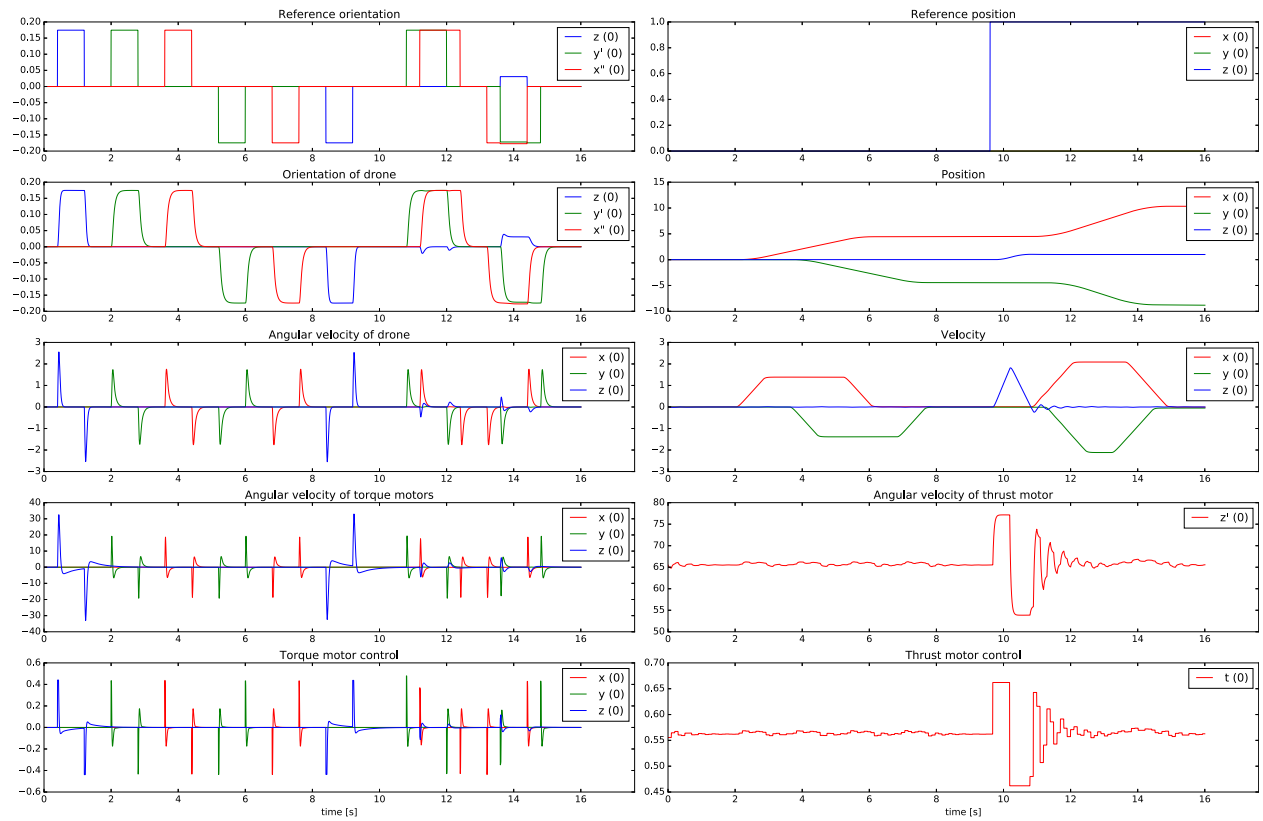
- $\mathbf{q}$  is the orientation of the drone, expressed as a unit quaternion.
- $\boldsymbol{\omega}$  is the angular velocity of the drone.
- $n$  is the speed of the torque motors.

### Linearisation

$$Q = \begin{pmatrix} 1.4e+02 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1.4e+02 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 2.4e+02 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0.15 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0.15 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0.041 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1e-10 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1e-10 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1e-10 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1e-10 \end{pmatrix}$$
$$R = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$
$$\begin{pmatrix} x_{k+1} \\ \vdots \\ d_{k+1} \end{pmatrix} = \begin{pmatrix} A & 0 \\ 0 & I_6 \end{pmatrix} \begin{pmatrix} x_k \\ \vdots \\ d_k \end{pmatrix} + \begin{pmatrix} B \\ 0 \end{pmatrix} u_k + \begin{pmatrix} I_9 & B \\ 0 & 0 \end{pmatrix} \begin{pmatrix} \delta_x \\ \vdots \\ \delta_u \\ \vdots \\ \delta_d \end{pmatrix} \quad y_k = \begin{pmatrix} C & I_6 \end{pmatrix} \begin{pmatrix} x_k \\ \vdots \\ d_k \end{pmatrix} + D u_k + v$$

1. Bias rejection attitude controller
2. Integral controller attitude controller
3. Flippen observer als yaw > 90°
4. SSH is traag
5. SSH fingerprint verandert heel de tijd
6. PWM limits: multiple defines
7. Router board bevestigen op de drone
8. Calibratie wanneer thrust geclamped wordt
9. Als de controller wegvalt, moet de drone stoppen!

1. ✓ Bias rejection attitude controller
2. ✓ Clamp thrust to 80%
3. ✓ Vliegen RC attitude + filmpje
4. ✓ Vliegen met altitude + filmpje
5. ✓ Schema controllers/observers afwerken
6. ✓ Montage GA
7. ✓ Blender animation
8. Keep  $q_0$  positive (slide 135)
9. ✓ Observer reset als thrust 0
10. Mousse IMU
11. When switching from altitude to attitude, gradually change thrust



Processing math: 100%

