At 0 seconds:

Missions with firefly in gazebo Mission with firefly in gazebo: chosen mission. This mission depends on:

- mission: mission

Converts 3D force and angular velocity into motor speeds, for a Firefly

Converts 3D force and angular velocity into motor speeds, for a Firefly attitude_proprotial_gain = 10 attitude_derivative_gain = 5.05964425627 attitude_z_derivative_gain = 5.0

- mission=TrajectoryTracking:

  Track a desired trajectory. This mission depends on:

  - controller: a trajectory tracking controller
  - reference: a reference position trajectory to be tracked
  - yaw_controller: a yaw controller
  - yaw_reference: a yaw reference

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  - controller=SimplePIDController:

    PID Controller, with saturation on integral part

    PID Controller, with saturation on integral part

    force(Δt, p,pd) = 1.56779*($pd^{(2)}$ + u($p^{(0)}$ - $pd^{(0)}$,$p^{(1)}$ - $pd^{(1)}$) + g e_3 - d^{est}), where

    - u_{xy}(p,v) = -1.0*p-1.4*v
    - u_z(p,v) = -1.96*p-2.8*v
    - $d_{xy}^{est(1)}$ = 0.0*(kp/2*ep + ev)
    - $|d_{xy}^{est(0)}| \leq$ 0.0
    - $d_z^{est(1)}$ = 0.0*(kp/2*ep + ev)
    - $|d_z^{est(0)}| \leq$ 0.5

  - reference=FixedPointTrajectory:

    Stay at rest at speficied point

    Trajectory with:

    - **offset = [0. 0. 1.]** in (m),
    - **rotation = [0. 0. 0.]** in (degrees).

  - yaw_controller=SimpleTrackingYawController:

    Simple yaw tracking controller, based on **feedback linearization of yaw rate equation**

    Controller for yaw motion.

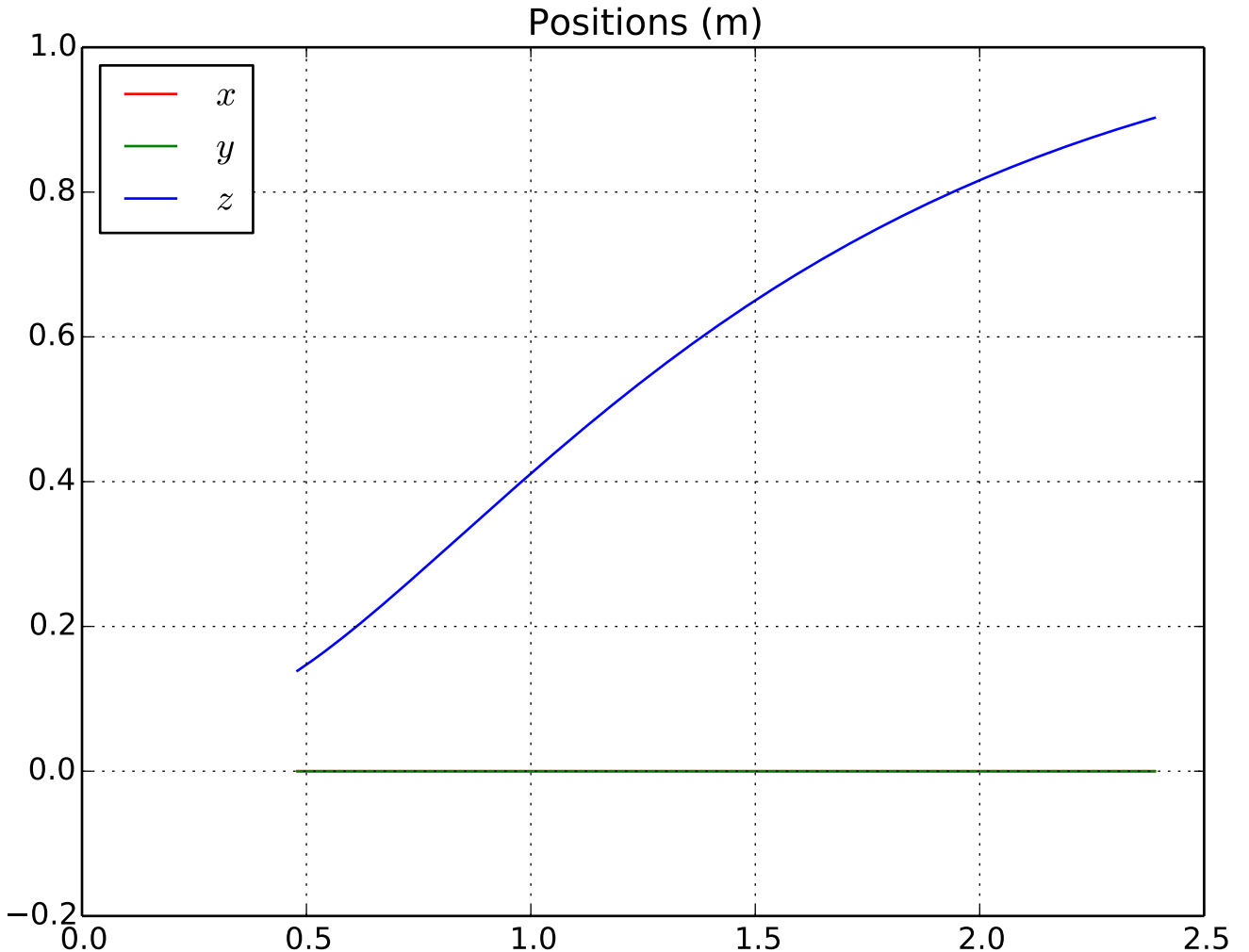
  - $\psi^{(1)} = \psi^{*(1)}$ - gain*sin(ψ - ψ^*)
  - yaw rate = cos(φ)(cos(θ)*$\psi^{(1)}$ - sin(φ)*$\theta^{(1)}$)
    Parameters:
    - gain: 4.0

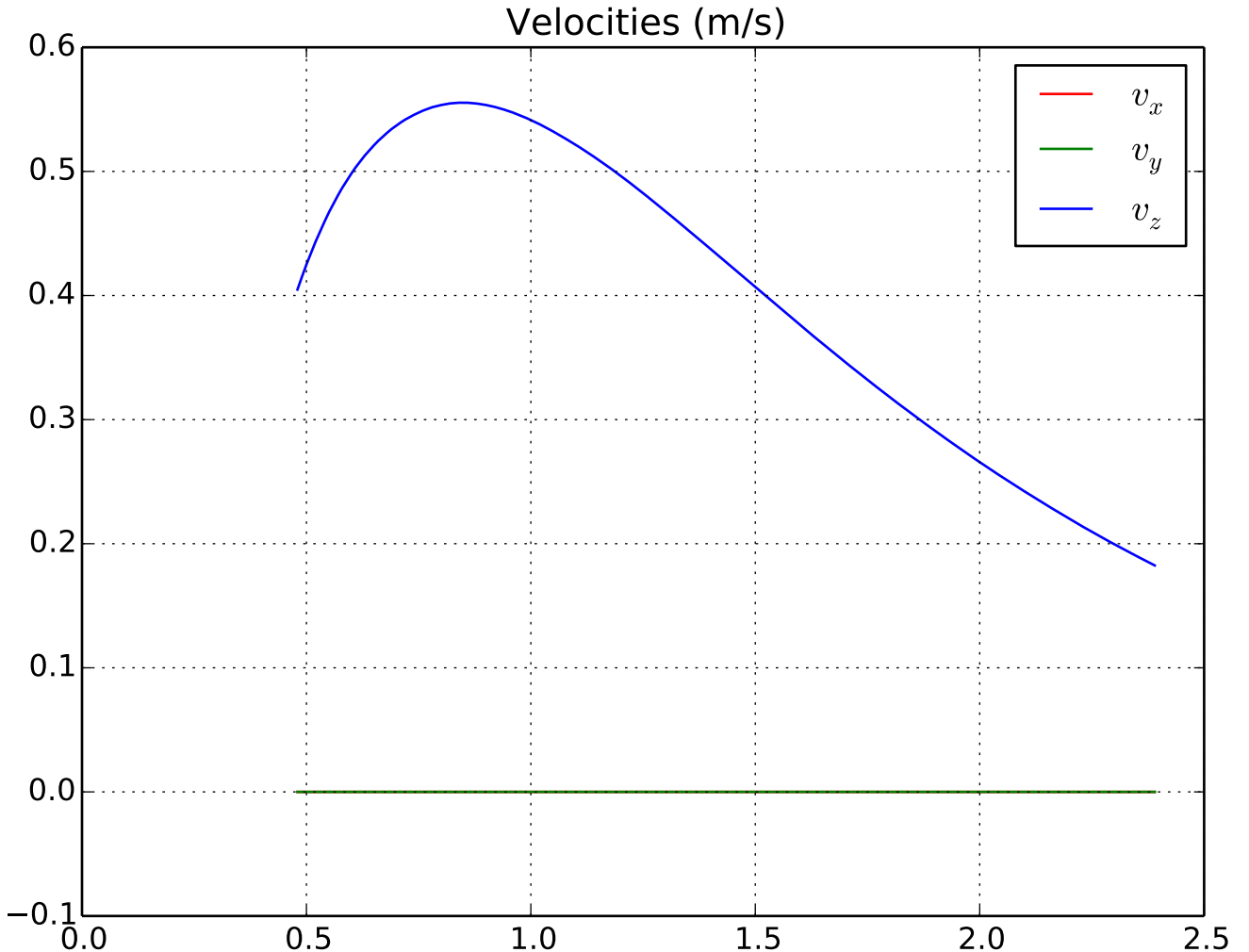
  - yaw_reference=FixedYawTrajectory:

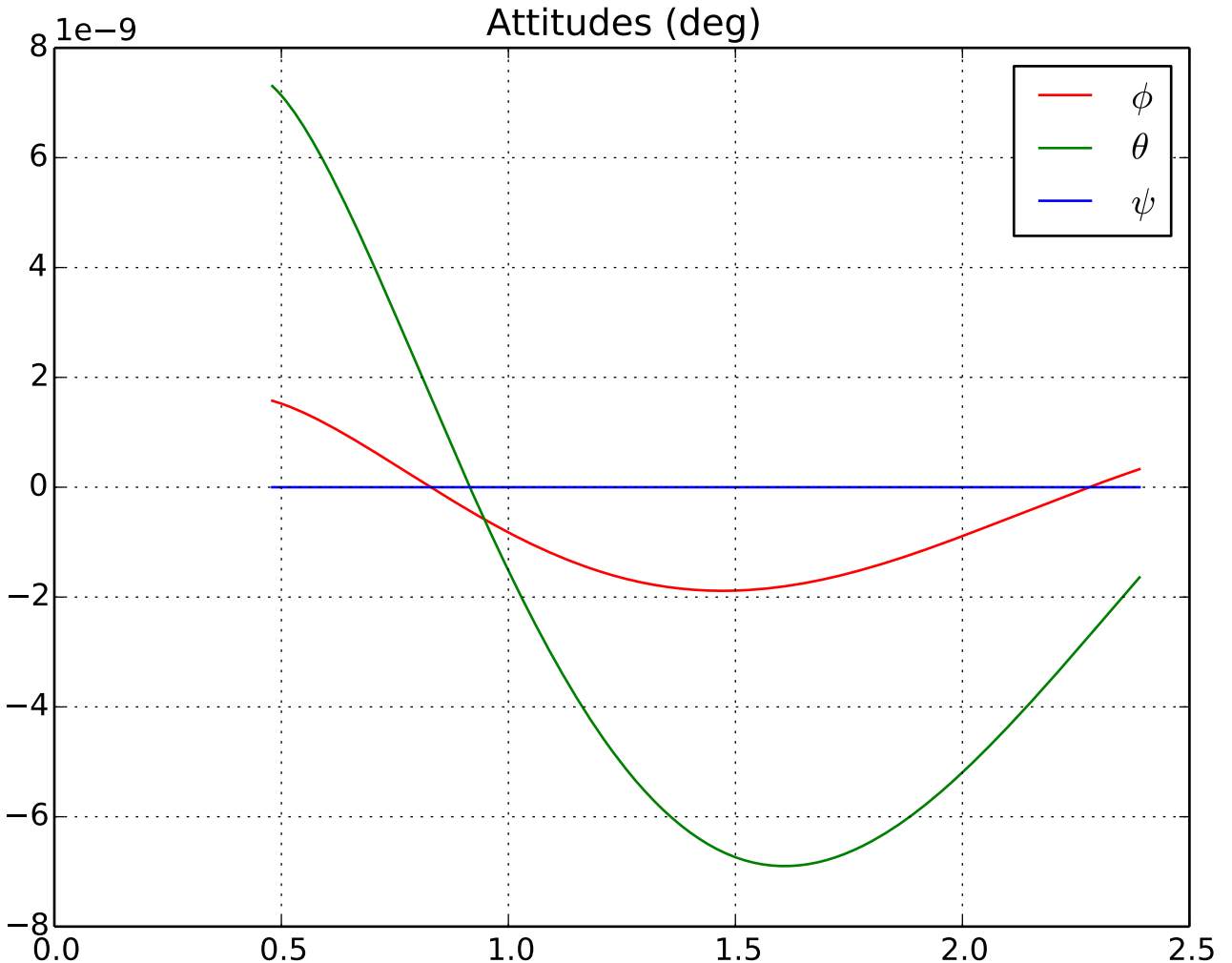
    Yaw angle to be constant

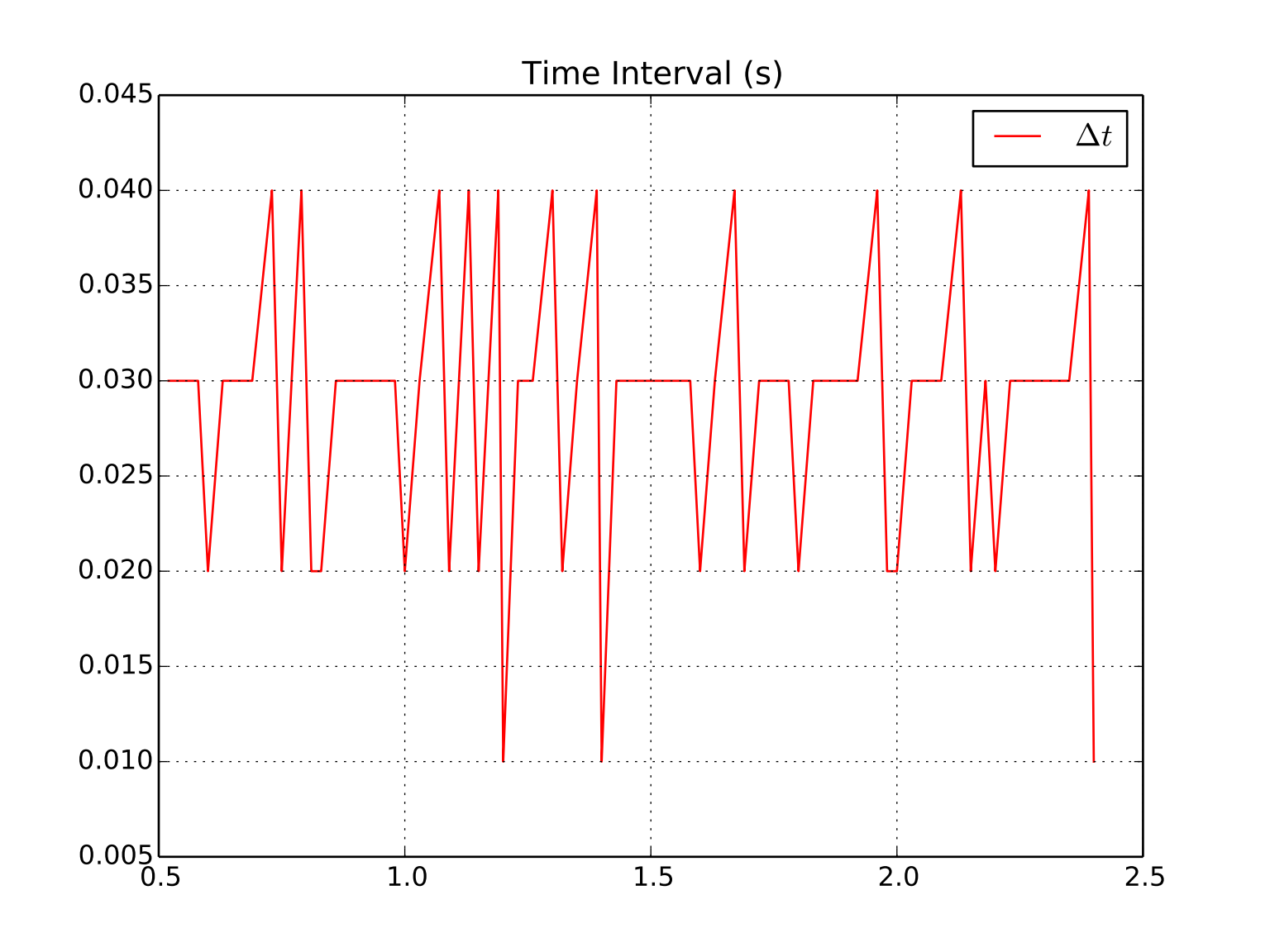
    Fixed yaw reference.

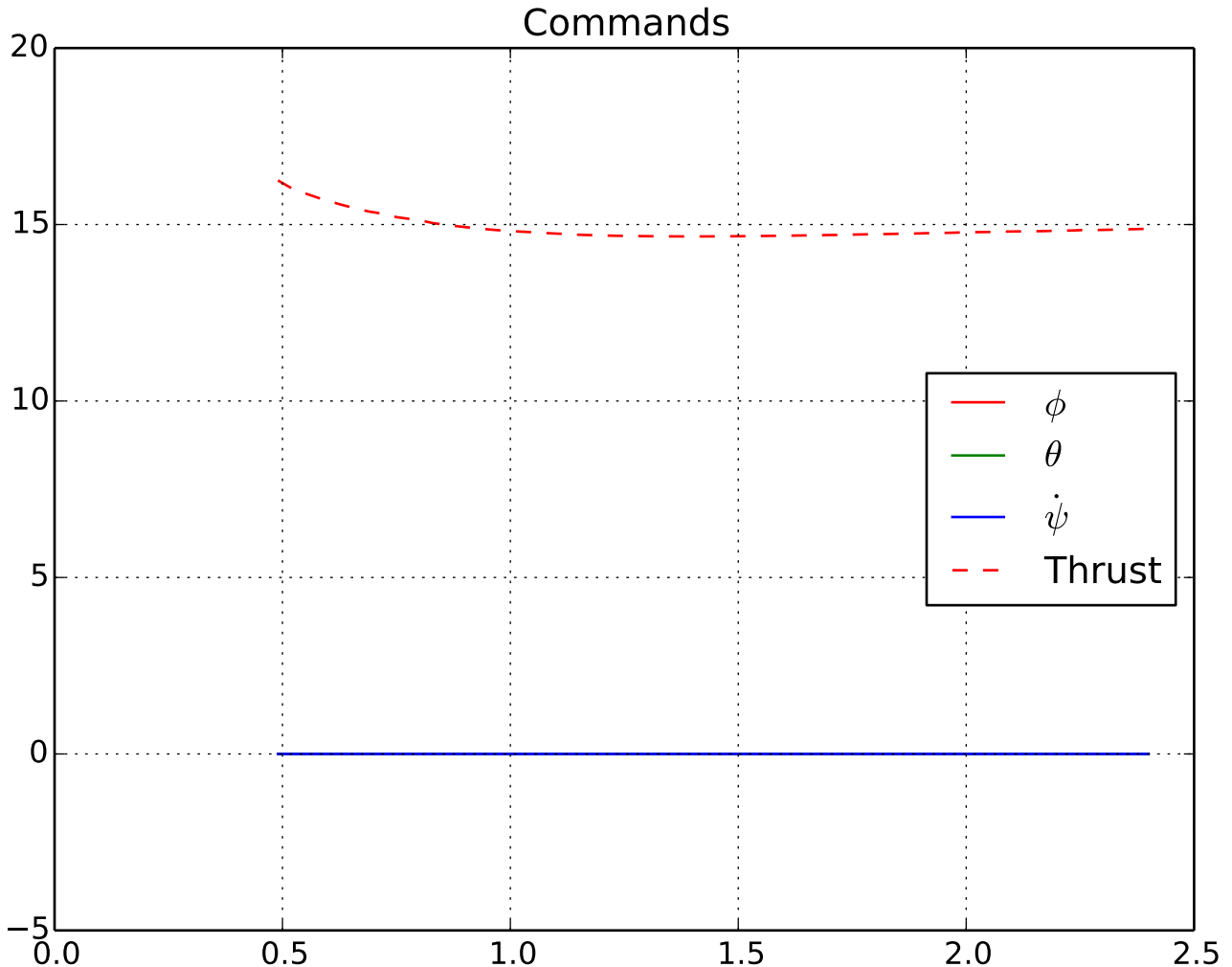
  - ψ^* = 0.0

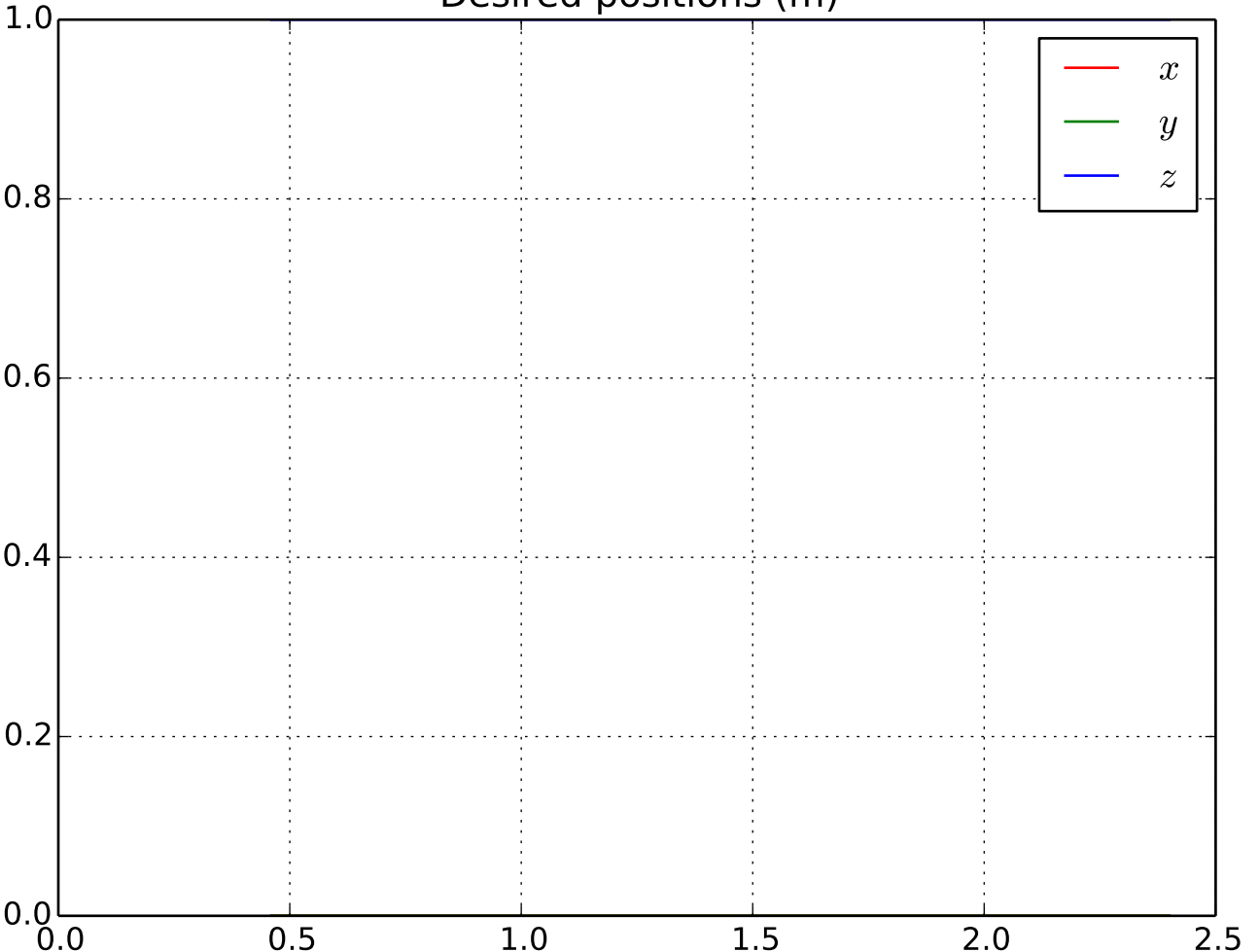

Positions (m)
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0.0
0.5
1.0
1.5
2.0
2.5
x
y
z


Velocities (m/s)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
−0.1
0.0
0.5
1.0
1.5
2.0
2.5
v_x
v_y
v_z


Attitudes (deg)
1e−9
8
6
4
2
0
−2
−4
−6
−8
0.0
0.5
1.0
1.5
2.0
2.5
ϕ
θ
ψ


Time Interval (s)
Δt
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.5
1.0
1.5
2.0
2.5


Commands
20
15
10
5
0
−5
0.0
0.5
1.0
1.5
2.0
2.5
ϕ
θ
$\dot{\psi}$
Thrust


Desired positions (m)
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.5
1.0
1.5
2.0
2.5
x
y
z