Calibration results
==========
Normalized Residuals

Reprojection error (cam0): mean 0.122070647324, median 0.118657833518, std: 0.0572351797572
Gyroscope error (imu0): mean 2.50769958351, median 2.51327907826, std: 0.753649513041
Accelerometer error (imu0): mean 31.9666775196, median 32.0650156162, std: 1.47038691253

Residuals

Reprojection error (cam0) [px]: mean 0.122070647324, median 0.118657833518, std: 0.0572351797572
Gyroscope error (imu0) [rad/s]: mean 0.00081374498223, median 0.000815555520417, std: 0.00024558
Accelerometer error (imu0) [m/s^2]: mean 1.06980965047, median 1.07310067265, std: 0.0492085581302

Transformation (cam0):

T_ci: (imu0 to cam0):
[[-0.00016686 -0.99999855 -0.00169312 0.0603575]
 [0.99999722 -0.00016287 -0.00235394 0.00003988]
 [0.00235366 -0.00169351 0.9999958 -0.100125]
 [0.   0.   0.   1.   ]]

T_ic: (cam0 to imu0):
[[-0.00016686 0.99999722 0.00235366 0.00020585]
 [-0.99999855 -0.00016287 -0.00169351 0.06018785]
 [-0.00169312 -0.00235394 0.9999958   0.10022687]
 [0.   0.   0.   1.   ]]

timeshift cam0 to imu0: [s] (t_imu = t_cam + shift)
0.003942084071428783

Gravity vector in target coords: [m/s^2]
[-0.00740863 9.80652941 -0.01867828]

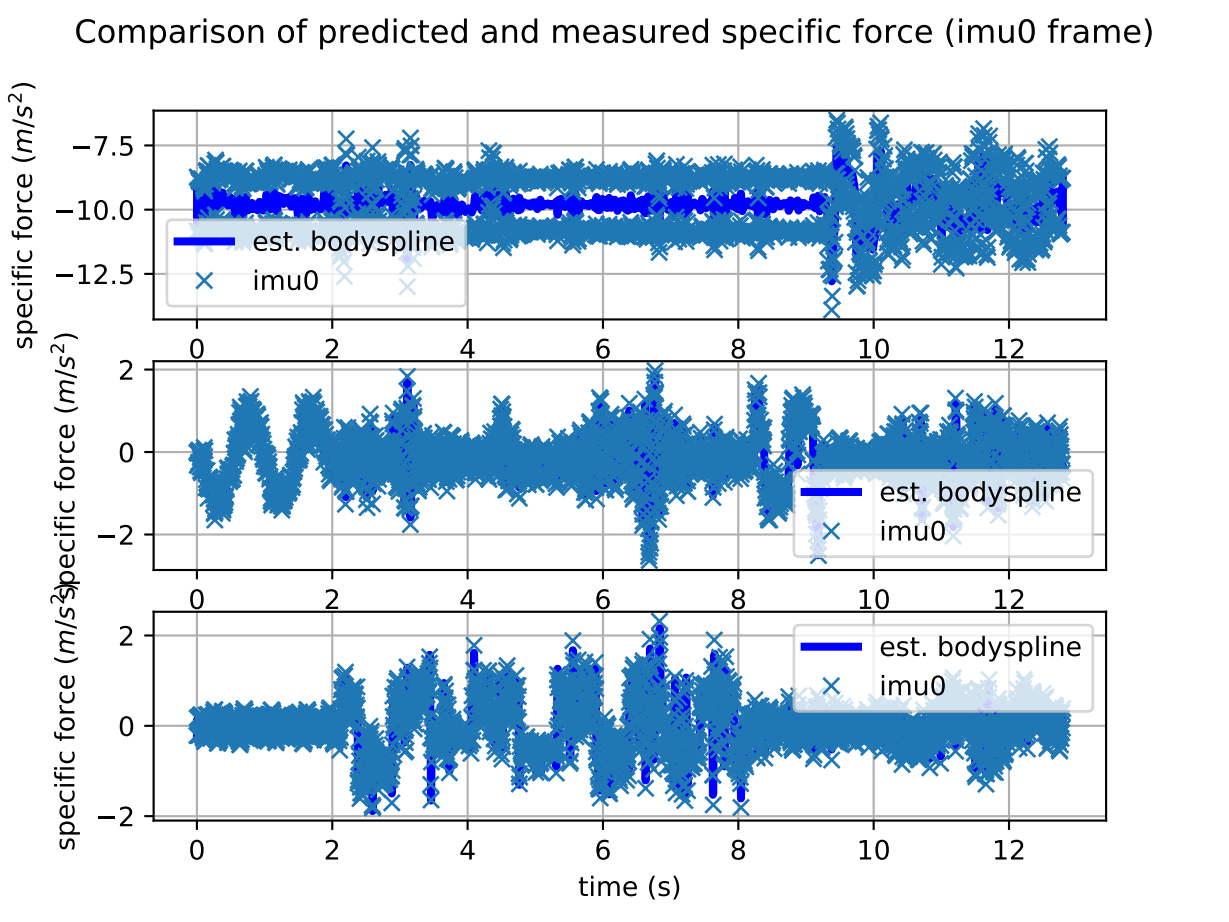
Calibration configuration

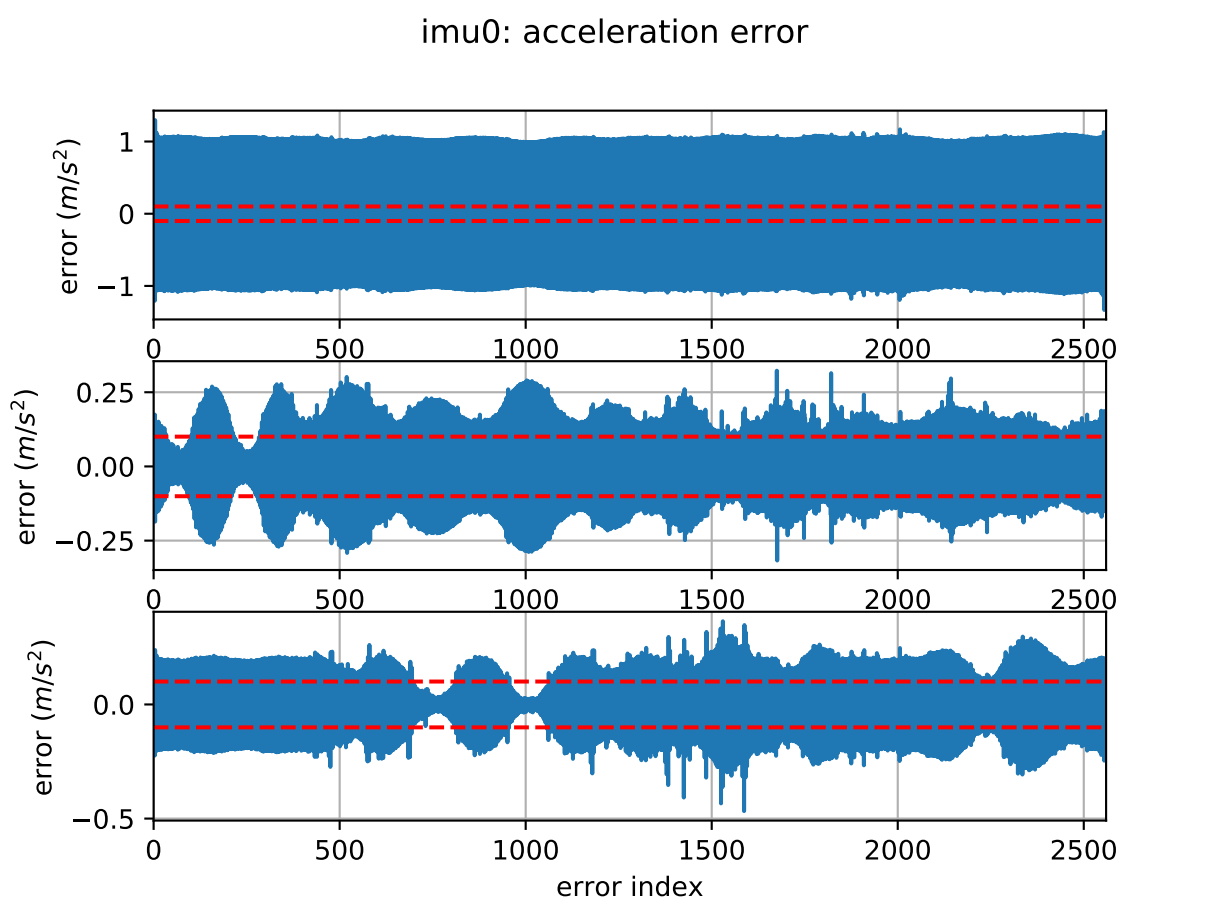
  Camera model: pinhole
  Focal length: [585.7561, 585.7561]
  Principal point: [320.5, 240.5]
  Distortion model: radtan
  Distortion coefficients: [0.0, 0.0, 0.0, 0.0]
  Type: checkerboard
  Rows
    Count: 6
    Distance: 0.01 [m]
  Cols
    Count: 7
    Distance: 0.01 [m]

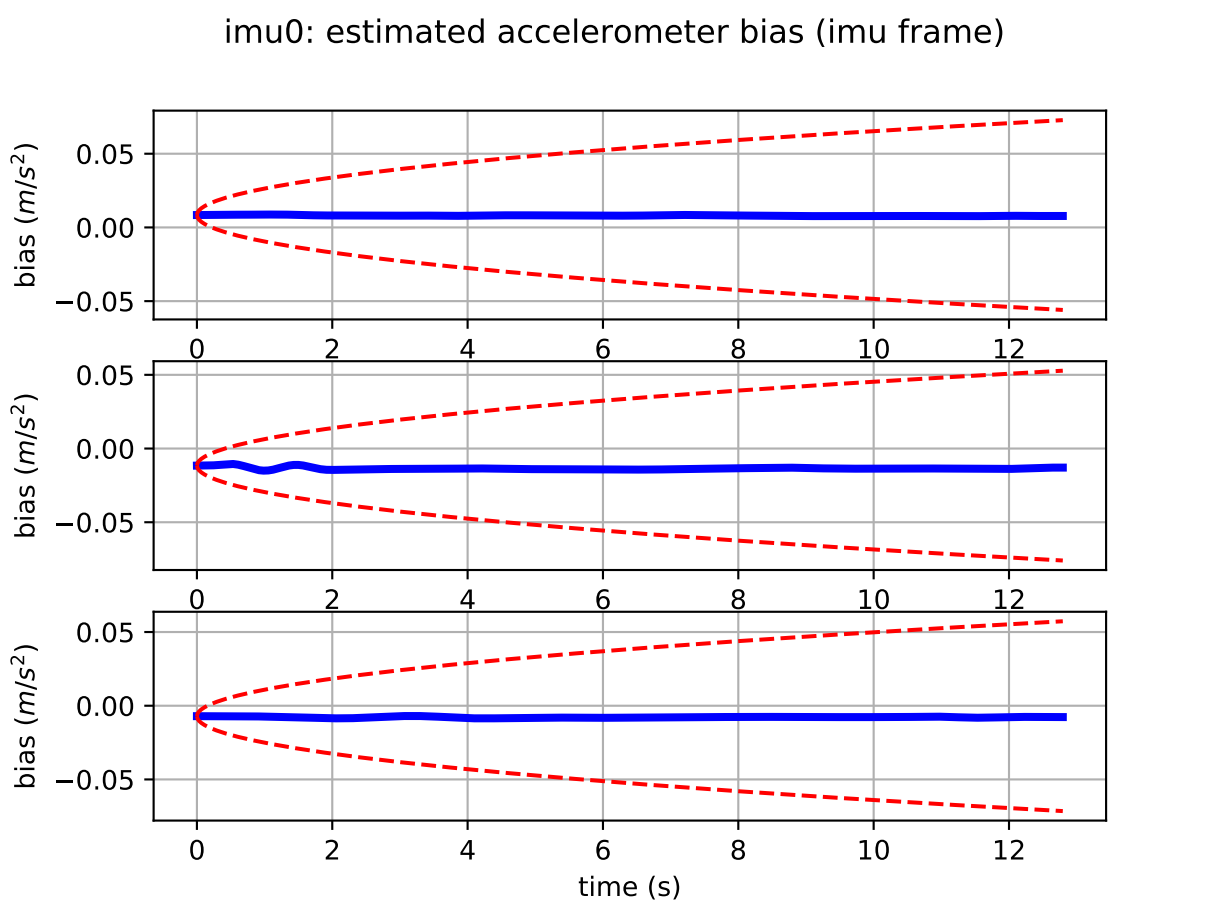
IMU configuration
==========

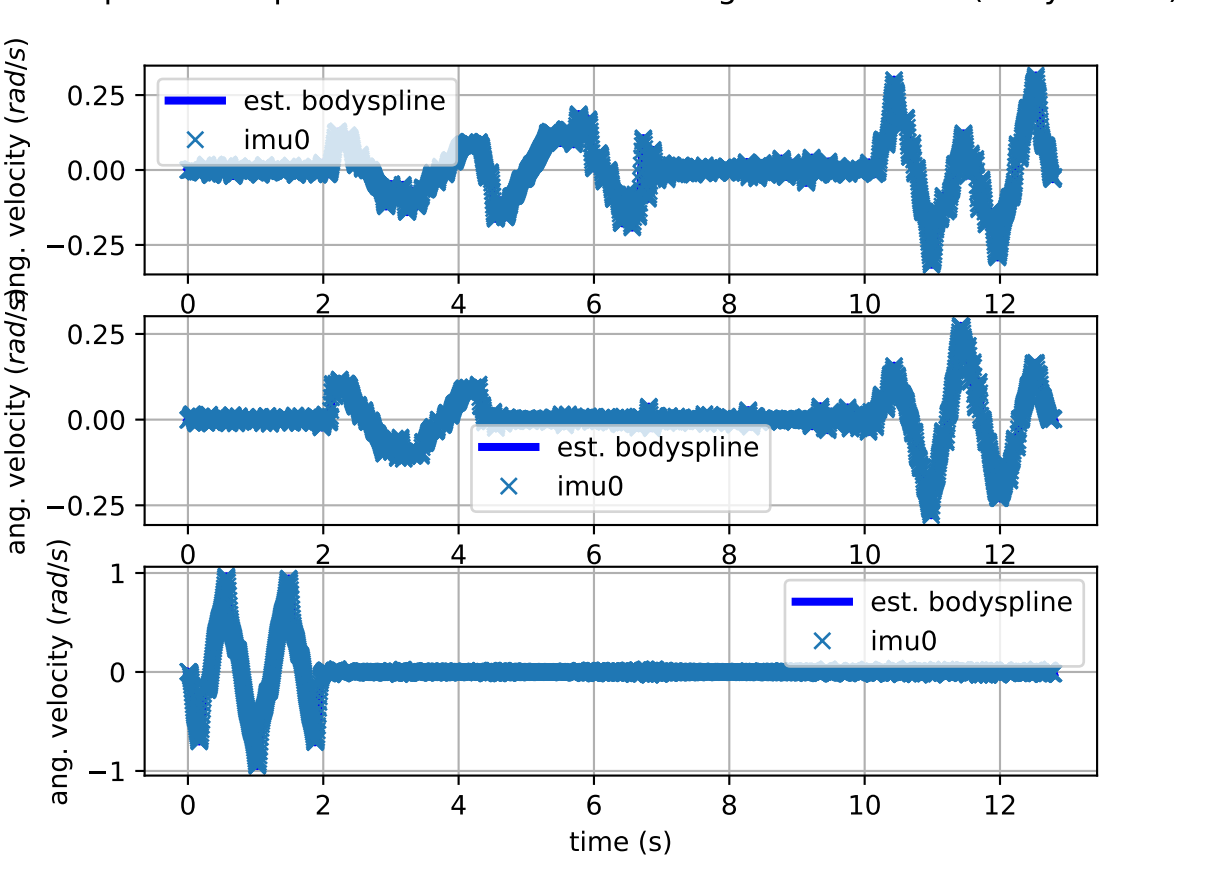
IMU0:

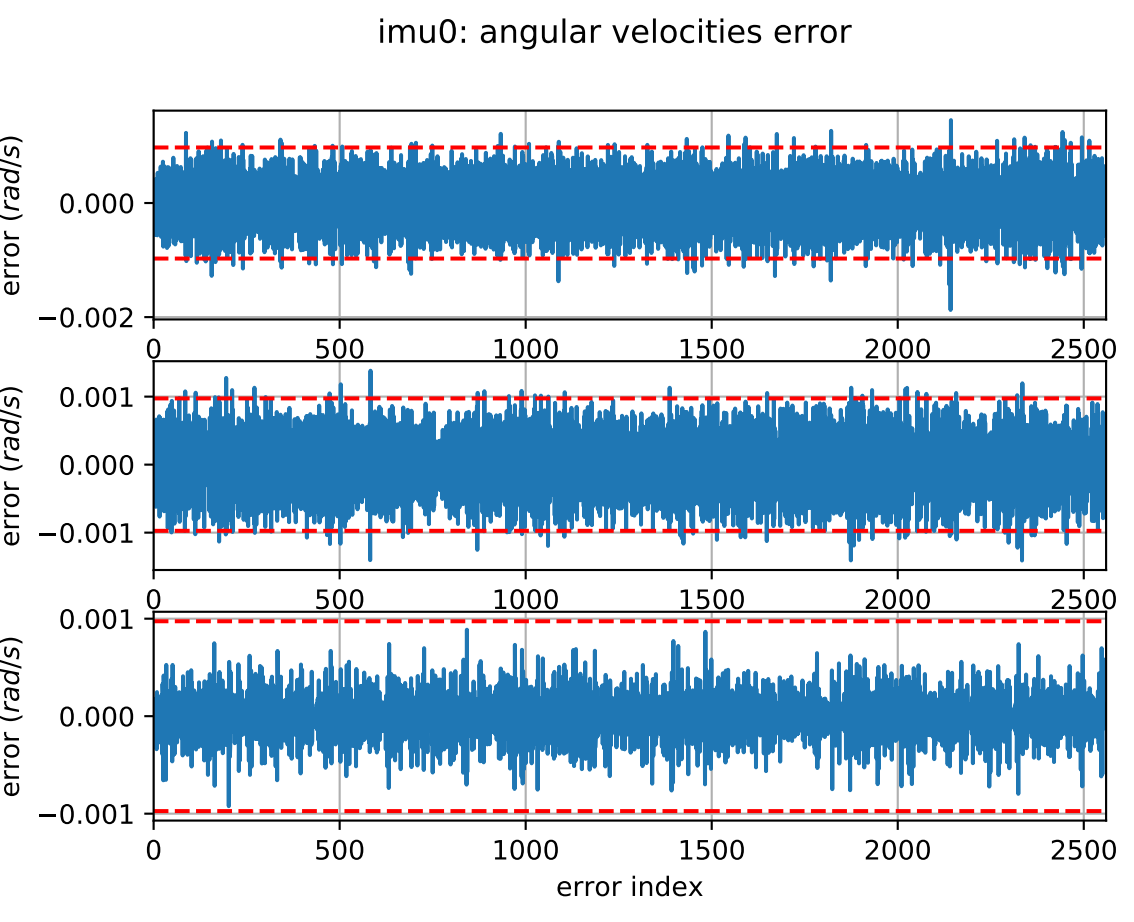
  Model: calibrated
  Update rate: 70.0
  Accelerometer:
    Noise density: 0.004
    Noise density (discrete): 0.0334664010614
    Random walk: 0.006
  Gyroscope:
    Noise density: 3.8785e-05
    Noise density (discrete): 0.000324498591291
    Random walk: 0.0003394
  T_i_b
    [[1. 0. 0. 0.]
     [0. 1. 0. 0.]
     [0. 0. 1. 0.]
     [0. 0. 0. 1.]]
  time offset with respect to IMU0: 0.0 [s]

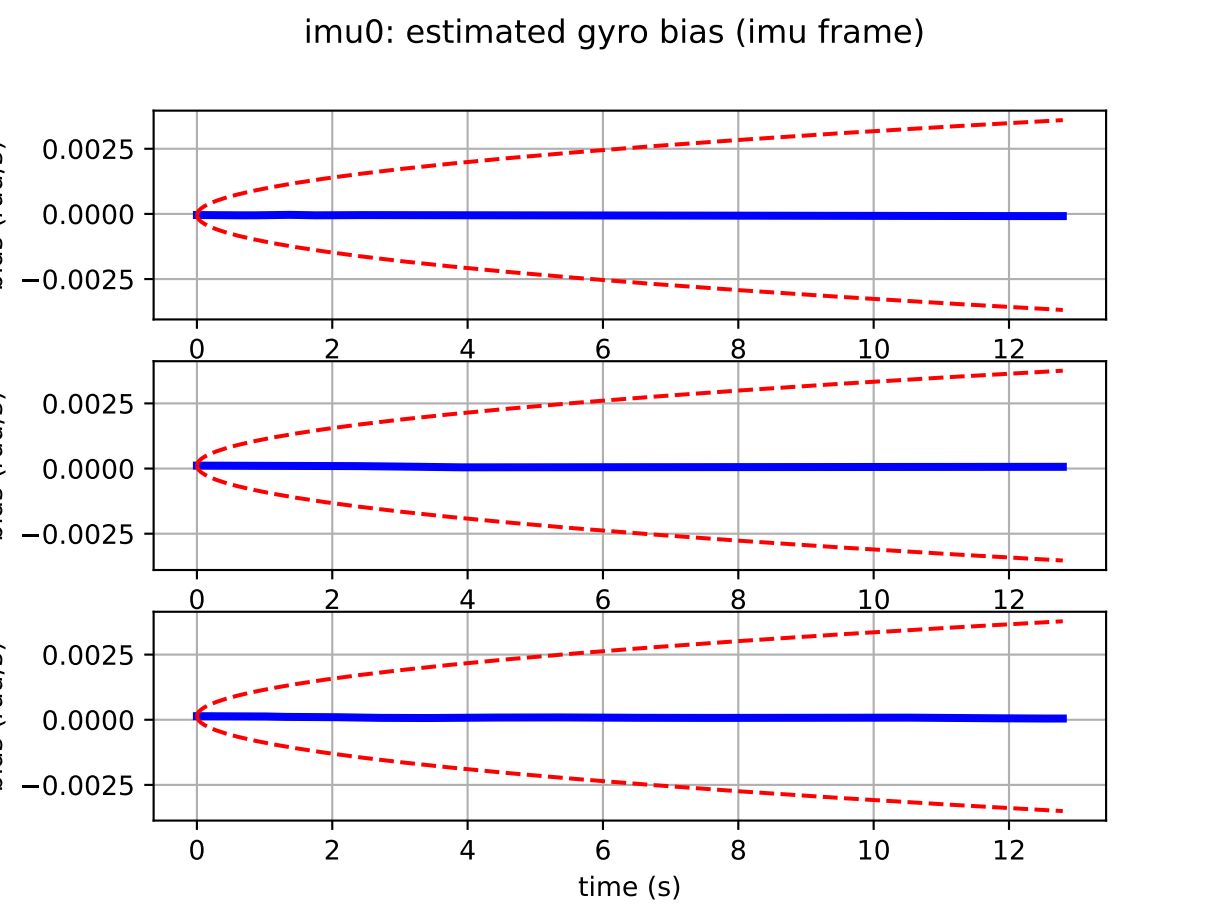

Comparison of predicted and measured specific force (imu0 frame)
specific force (m/s^2)
specific force (m/s^2)
specific force (m/s^2)
time (s)
est. bodyspline
imu0
est. bodyspline
imu0
est. bodyspline
imu0
−7.5
−10.0
−12.5
2
0
−2
0
2
4
6
8
10
12

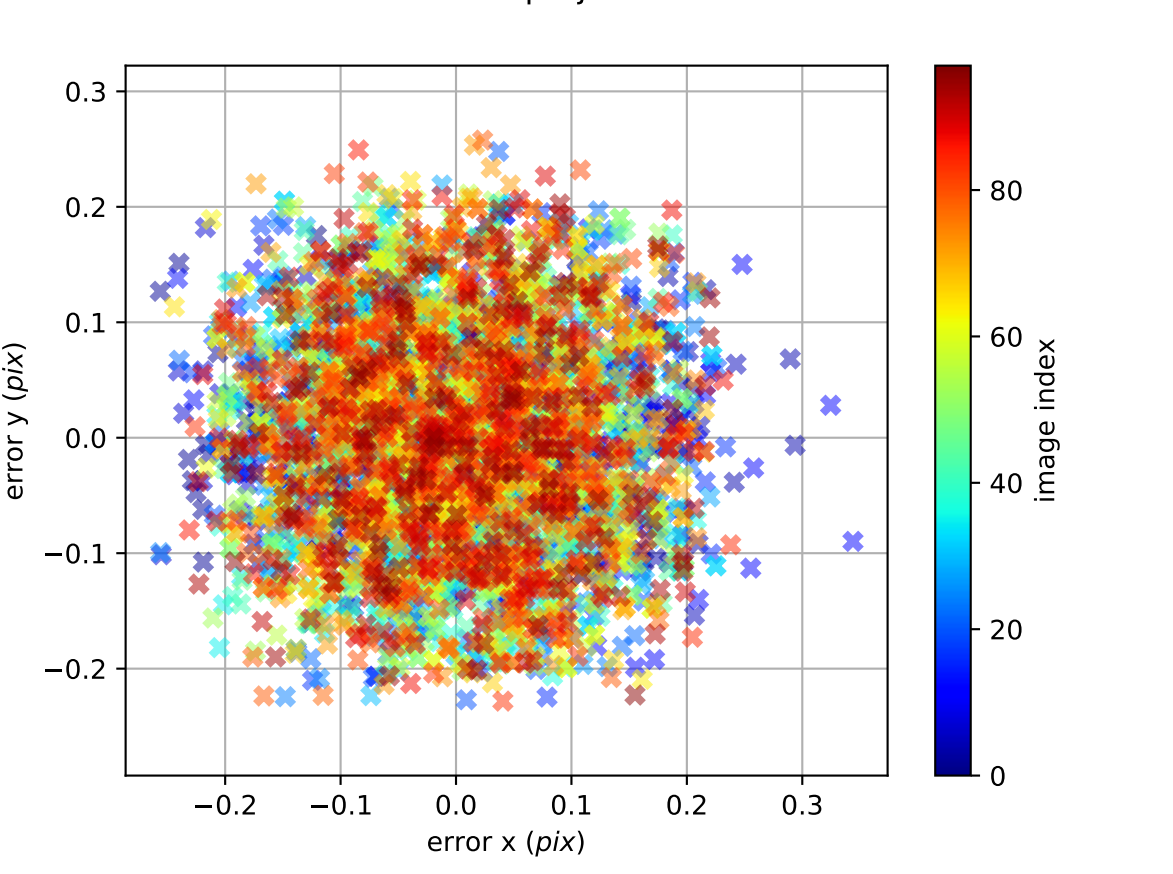

imu0: acceleration error
error (m/s^2)
1
0
−1
0
500
1000
1500
2000
2500
error (m/s^2)
0.25
0.00
−0.25
0
500
1000
1500
2000
2500
error (m/s^2)
0.0
−0.5
0
500
1000
1500
2000
2500
error index


imu0: estimated accelerometer bias (imu frame)
bias (m/s^2)
0.05
0.00
−0.05
0
2
4
6
8
10
12
time (s)


Comparison of predicted and measured angular velocities (body frame)
ang. velocity (rad/s)
est. bodyspline
imu0
0.25
0.00
−0.25
0
2
4
6
8
10
12
ang. velocity (rad/s)
est. bodyspline
imu0
0.25
0.00
−0.25
0
2
4
6
8
10
12
ang. velocity (rad/s)
est. bodyspline
imu0
1
0
−1
0
2
4
6
8
10
12
time (s)


imu0: angular velocities error
error (rad/s)
0.000
−0.002
0
500
1000
1500
2000
2500
error (rad/s)
0.001
0.000
−0.001
0
500
1000
1500
2000
2500
error (rad/s)
0.001
0.000
−0.001
0
500
1000
1500
2000
2500
error index


imu0: estimated gyro bias (imu frame)
0.0025
0.0000
−0.0025
0
2
4
6
8
10
12
time (s)


cam0: reprojection errors
0.3
0.2
0.1
0.0
−0.1
−0.2
error y (pix)
−0.2
−0.1
0.0
0.1
0.2
0.3
error x (pix)
80
60
40
20
0
image index