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Calibration results
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Normalized Residuals
----------------------------
Reprojection error (cam0):     mean 0.29126893092100636, median 0.19738202030439825, std: 0.2900461521331735
Gyroscope error (imu0):        mean 0.24840864626293604, median 0.20457764689434205, std: 0.15745432123108016
Accelerometer error (imu0):    mean 0.19130514580011815, median 0.16978635651718652, std: 0.1150735614454712

Residuals
----------------------------
Reprojection error (cam0) [px]:     mean 0.29126893092100636, median 0.19738202030439825, std:
0.2900461521331735
Gyroscope error (imu0) [rad/s]:     mean 0.002066304887451029, median 0.0017017112648871674, std:
0.001309731518627132
Accelerometer error (imu0) [m/s^2]: mean 0.03275429169708944, median 0.029069954309334192, std:
0.01970230848963176

Transformation (cam0):
-----------------------
T_ci:  (imu0 to cam0):
[[ 0.01842093 -0.99982852 -0.00189859 -0.01120563]
[-0.99982753 -0.01842532  0.00232562 -0.00015244]
[-0.0023602   0.00185542 -0.99999549 -0.12025091]
[ 0.          0.          0.          1.        ]]

T_ic:  (cam0 to imu0):
[[ 0.01842093 -0.99982753 -0.0023602  -0.00022981]
[-0.99982852 -0.01842532  0.00185542 -0.0109834 ]
[-0.00189859  0.00232562 -0.99999549 -0.12027129]
[ 0.          0.          0.          1.        ]]

timeshift cam0 to imu0: [s] (t_imu = t_cam + shift)
-0.027495113771703755


Gravity vector in target coords: [m/s^2]
[-0.03169225 -9.80640211  0.04354567]
```

Calibration configuration
==========

cam0

Camera model: pinhole
Focal length: [631.8121282110981, 630.5950123045492]
Principal point: [475.2380600438913, 297.61583384199184]
Distortion model: radtan
Distortion coefficients: [0.024695570573106992, -0.029349201691012974, 0.00032864355328926395, 0.00032525153518354 21]
Type: aprilgrid
Tags:
Rows: 6
Cols: 6
Size: 0.02 [m]
Spacing 0.006 [m]

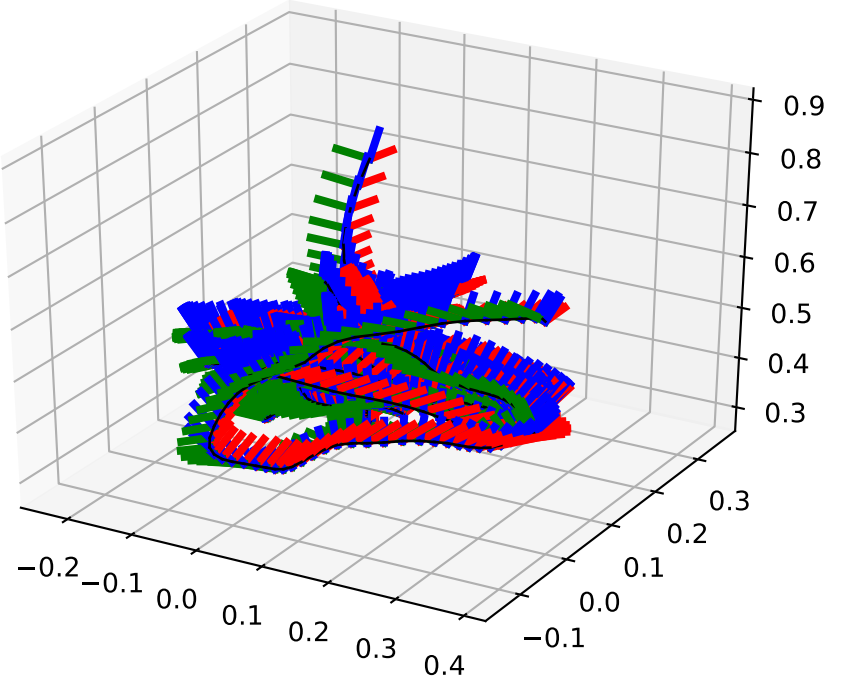
IMU configuration
==========

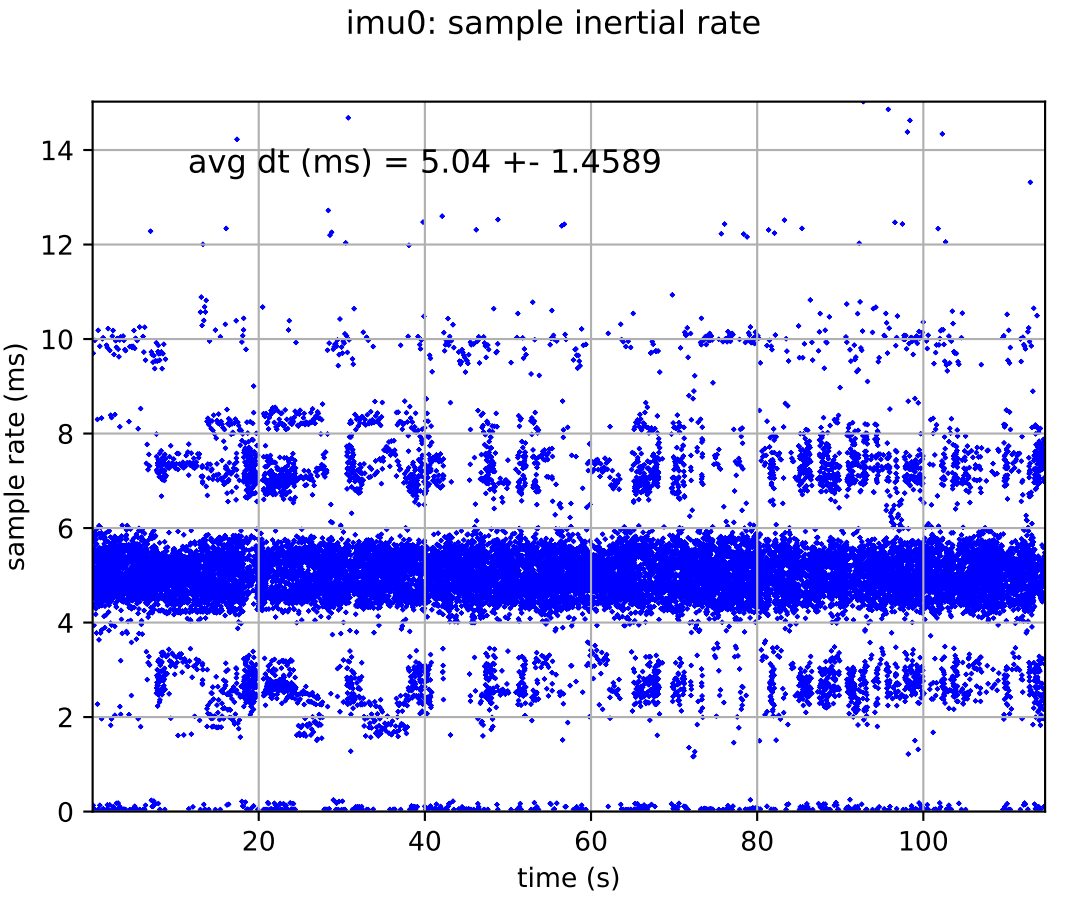
IMU0:

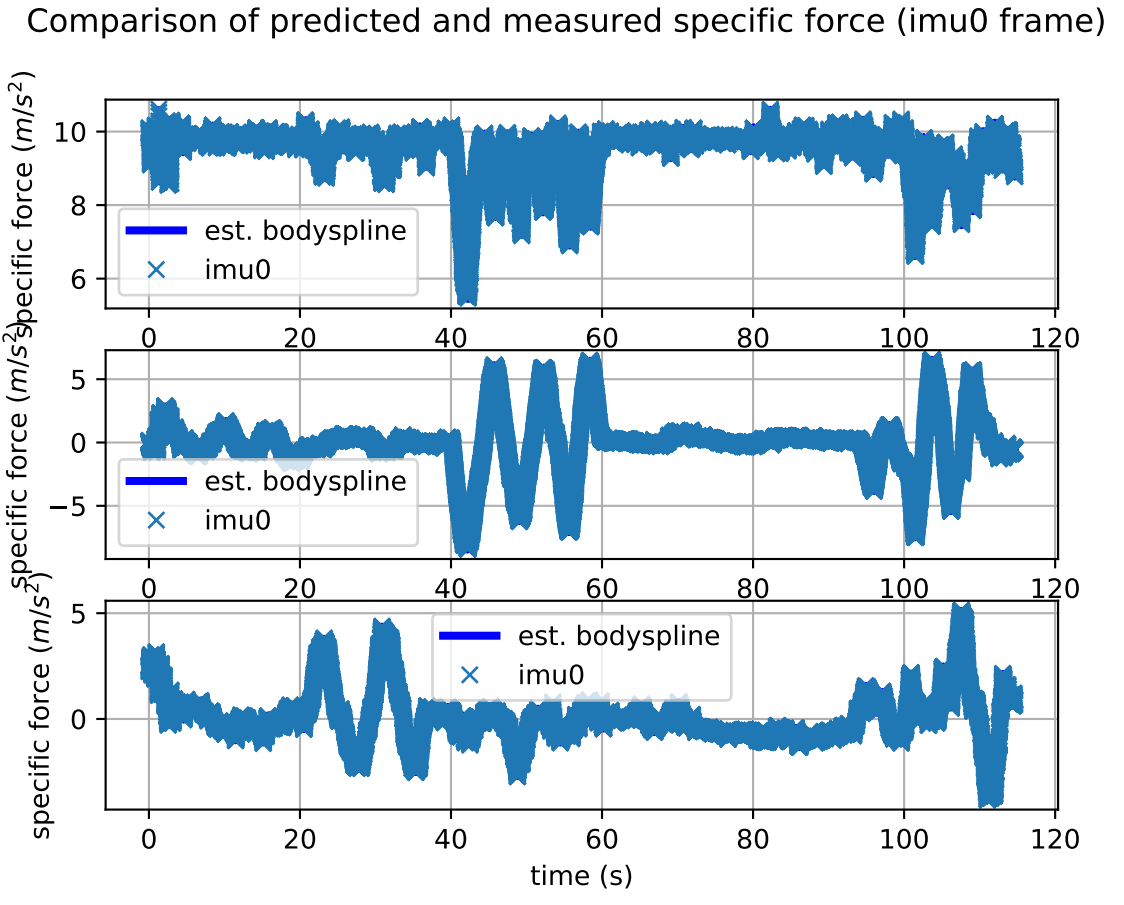
Model: calibrated
Update rate: 200.0
Accelerometer:
Noise density: 0.01210672179
Noise density (discrete): 0.17121490151295873
Random walk: 0.001431059201817203
Gyroscope:
Noise density: 0.00058818331
Noise density (discrete): 0.008318168141634986
Random walk: 3.664343e-05

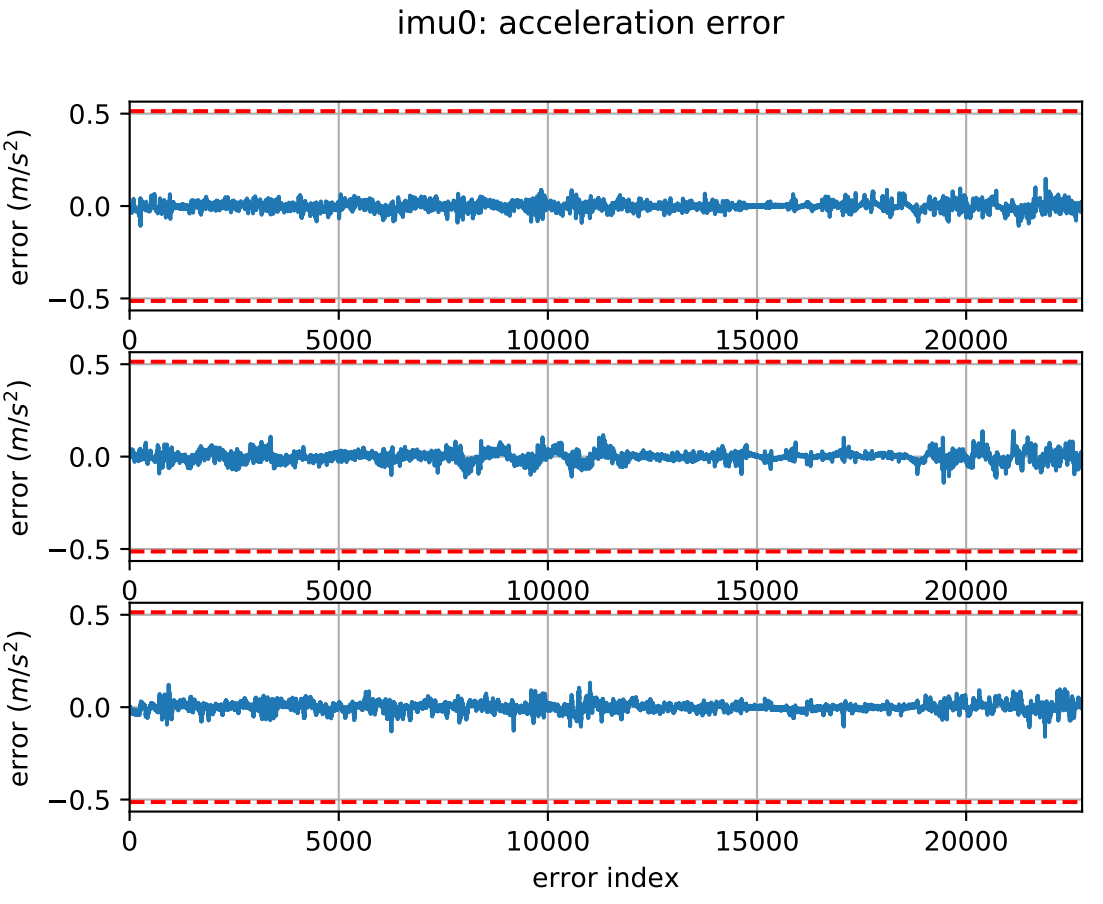
```
T_ib (imu0 to imu0)
[[1. 0. 0. 0.]
[0. 1. 0. 0.]
[0. 0. 1. 0.]
[0. 0. 0. 1.]]
time offset with respect to IMU0: 0.0 [s]
```

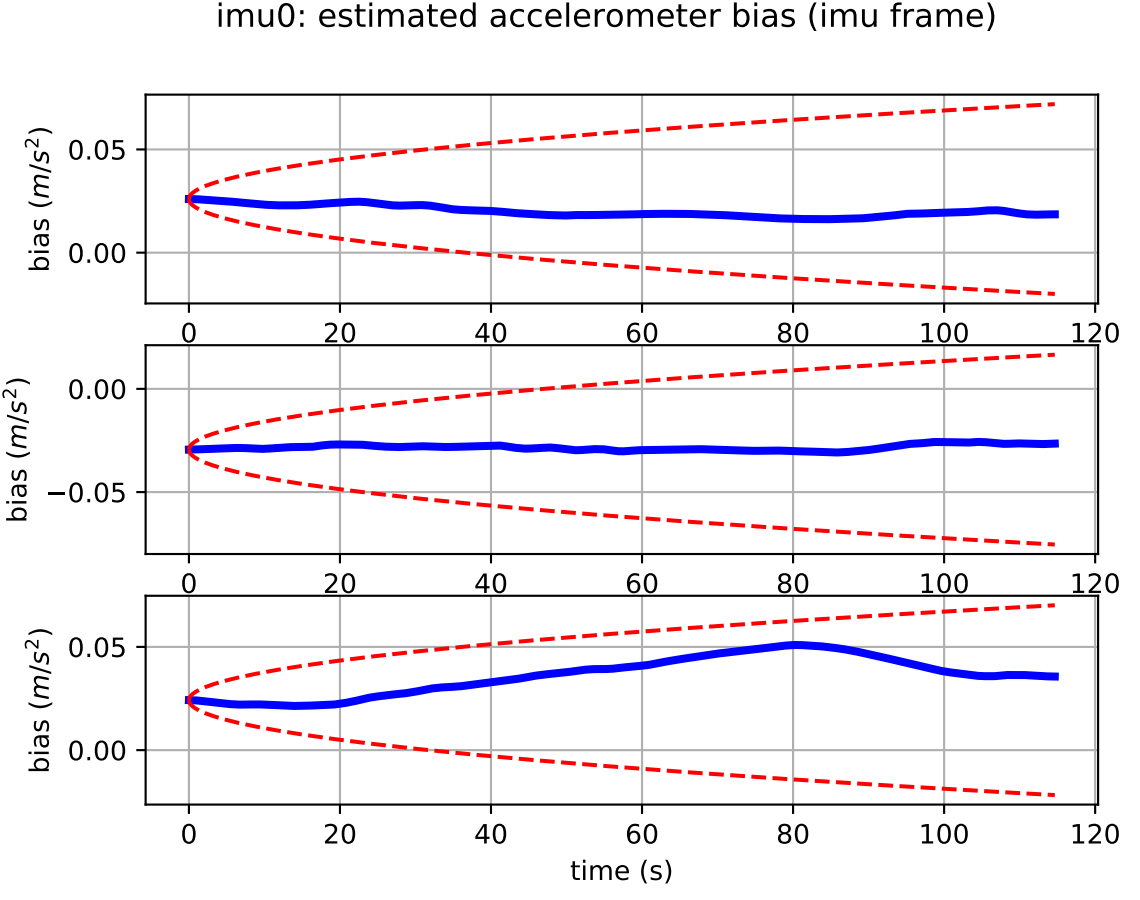
imu0: estimated poses



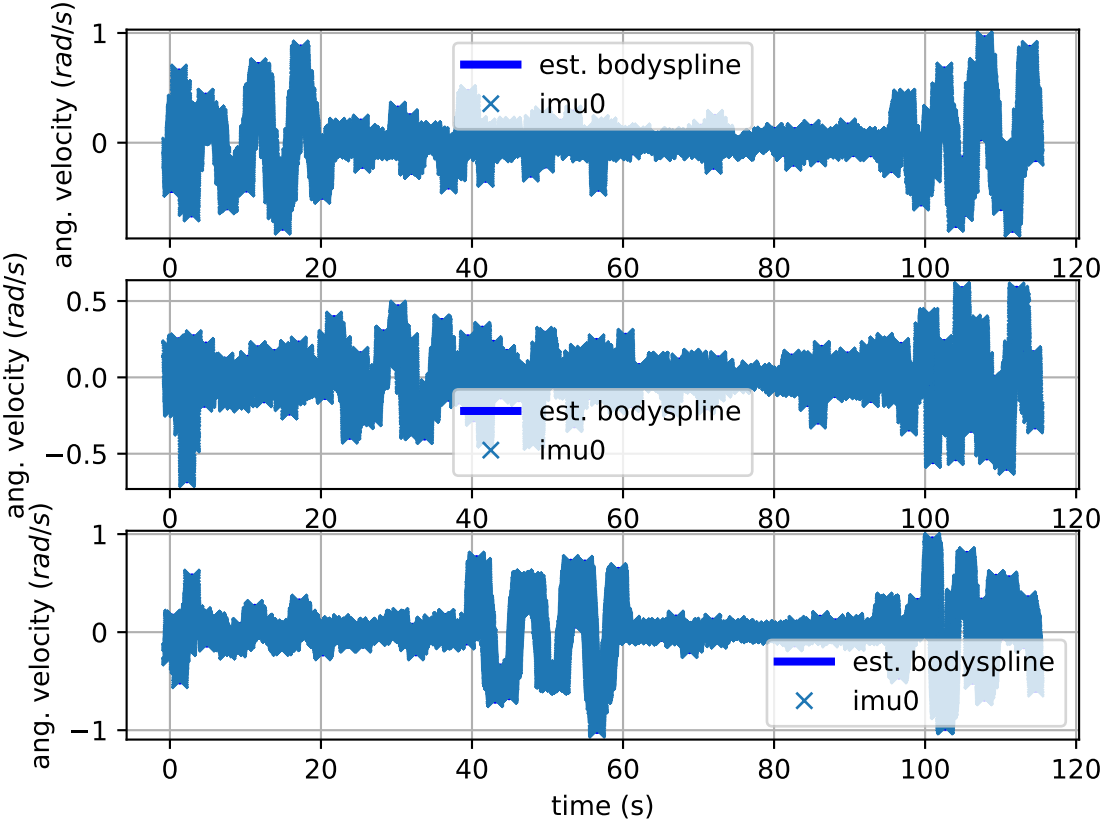

imu0: sample inertial rate
avg dt (ms) = 5.04 +- 1.4589
sample rate (ms)
time (s)
0
2
4
6
8
10
12
14
20
40
60
80
100

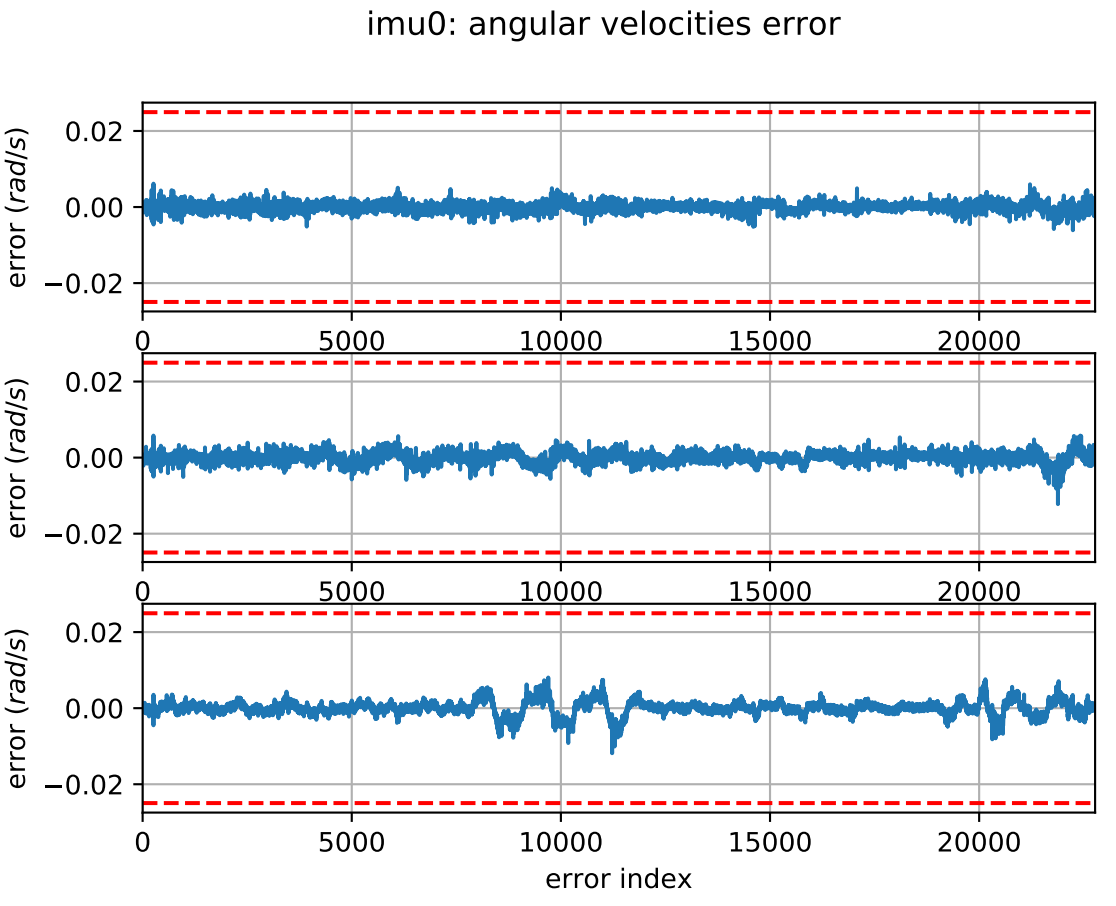

Comparison of predicted and measured specific force (imu0 frame)
specific force (m/s^2)
est. bodyspline
imu0
10
8
6
0
20
40
60
80
100
120
specific force (m/s^2)
est. bodyspline
imu0
5
0
−5
specific force (m/s^2)
est. bodyspline
imu0
5
0
time (s)

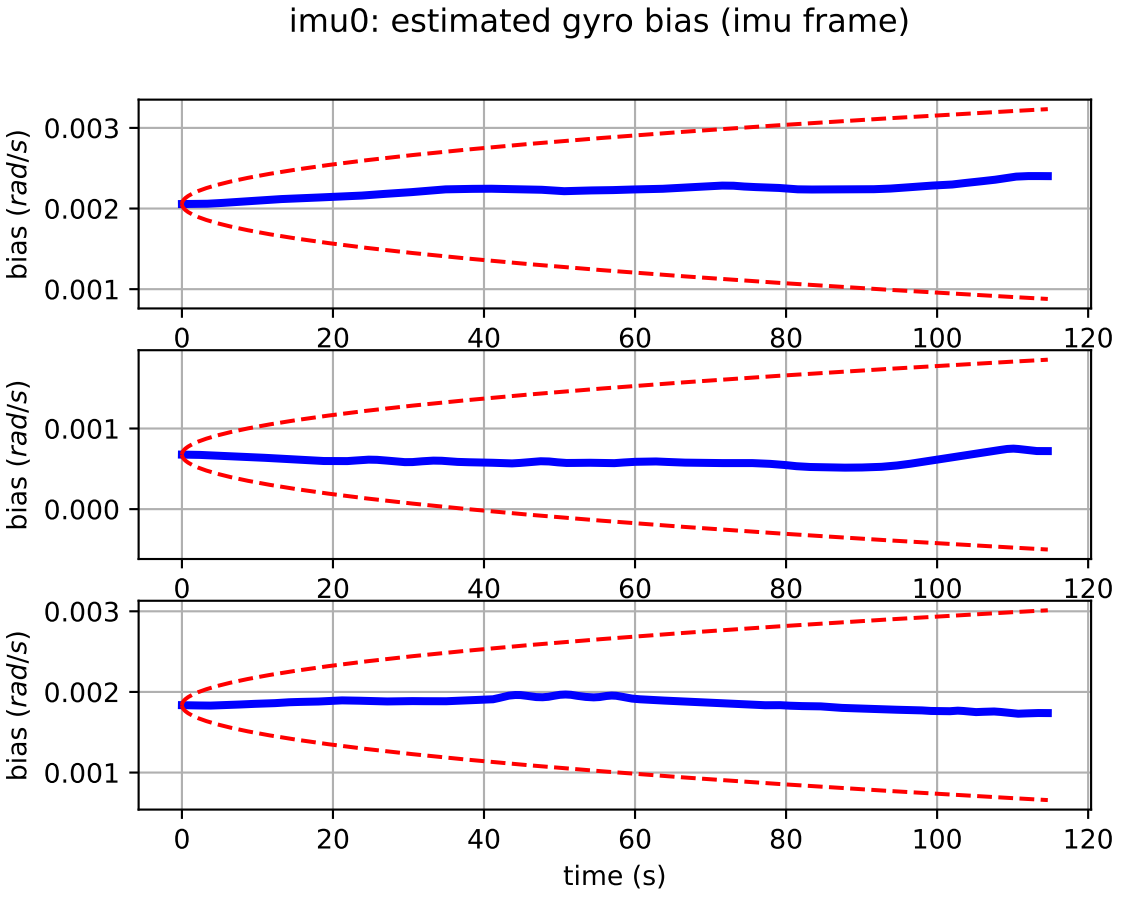

imu0: acceleration error
error (m/s^2)
0.5
0.0
−0.5
0
5000
10000
15000
20000
error index

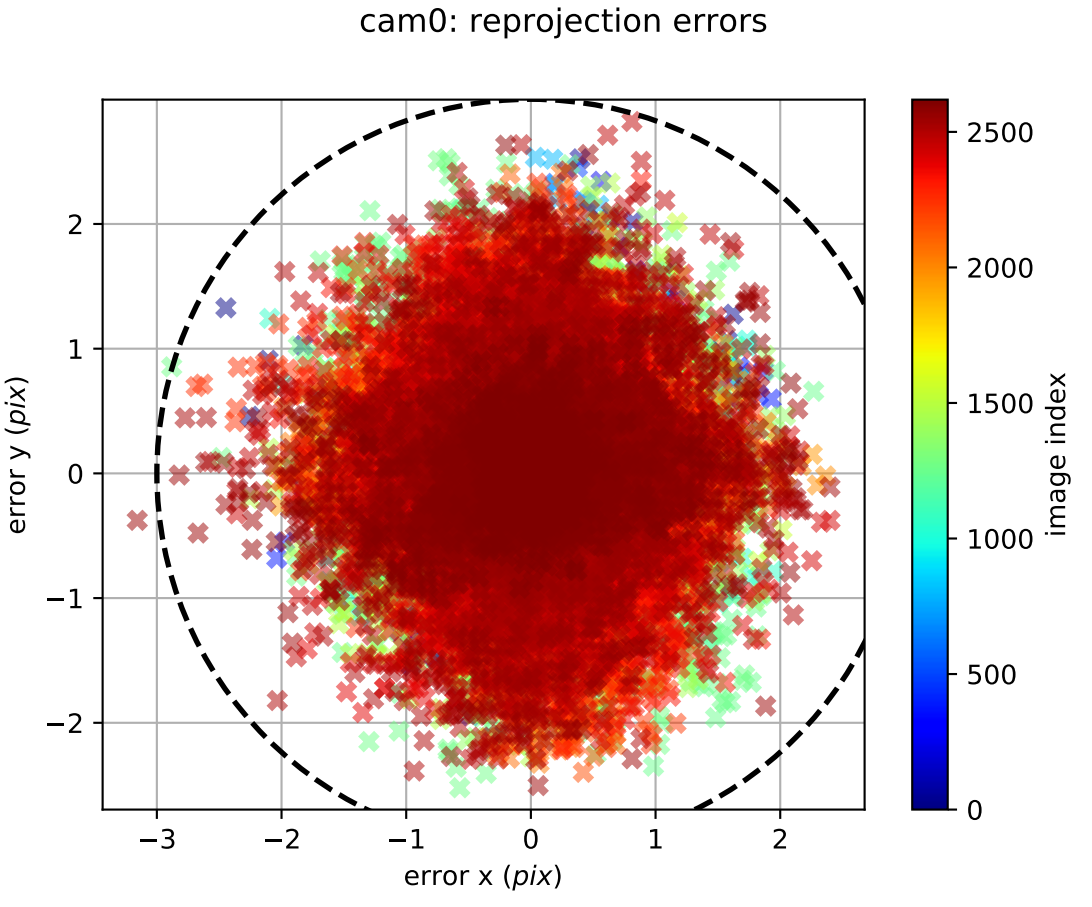

imu0: estimated accelerometer bias (imu frame)
bias (m/s^2)
0.05
0.00
0
20
40
60
80
100
120
bias (m/s^2)
0.00
−0.05
0
20
40
60
80
100
120
bias (m/s^2)
0.05
0.00
0
20
40
60
80
100
120
time (s)

Comparison of predicted and measured angular velocities (body frame)




imu0: angular velocities error
error (rad/s)
0.02
0.00
−0.02
0
5000
10000
15000
20000
error index


imu0: estimated gyro bias (imu frame)
bias (rad/s)
0.003
0.002
0.001
0
20
40
60
80
100
120
bias (rad/s)
0.001
0.000
0
20
40
60
80
100
120
bias (rad/s)
0.003
0.002
0.001
0
20
40
60
80
100
120
time (s)


cam0: reprojection errors
error y (pix)
error x (pix)
image index
−3
−2
−1
0
1
2
2500
2000
1500
1000
500
0