Calibration results
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Normalized Residuals

Reprojection error (cam0): mean 0.408492931815, median 0.302918387341, std: 0.369627144204
Reprojection error (cam1): mean 0.428014602699, median 0.353125431561, std: 0.30365365842
Gyroscope error (imu0): mean 2.80970749902, median 1.45881251646, std: 3.48407513739
Accelerometer error (imu0): mean 1.81225085499, median 1.32742322867, std: 1.58080790864

Residuals

Reprojection error (cam0) [px]: mean 0.408492931815, median 0.302918387341, std: 0.369627144204
Reprojection error (cam1) [px]: mean 0.428014602699, median 0.353125431561, std: 0.30365365842
Gyroscope error (imu0) [rad/s]: mean 0.00958767540006, median 0.00497796332262, std: 0.0118888466142
Accelerometer error (imu0) [m/s^2]: mean 0.0817206053599, median 0.0598580651882, std: 0.0712840492785

Transformation (cam0):

T_ci: (imu0 to cam0):
[[-0.02138033 0.99976292 0.00412161 0.07714832]
[0.00179547 -0.00408415 0.99999005 0.1386398]
[0.9997698   0.02138752 -0.00170773 -0.2249316]
[0.   0.   0.   1.   ]]

T_ic: (cam0 to imu0):
[[-0.02138033 0.00179547 0.9997698   0.22628036]
[0.99976292 -0.00408415 0.02138752 -0.07175307]
[0.00412161 0.99999005 -0.00170773 -0.13934052]
[0.   0.   0.   1.   ]]

timeshift cam0 to imu0: [s] (t_imu = t_cam + shift)
-0.013139657097

Transformation (cam1):

T_ci: (imu0 to cam1):
[[-0.00528267 0.99997372 0.00496592 -0.07270966]
[0.00076801 -0.00496193 0.99998739 0.13869472]
[0.99998575 0.00528641 -0.00074178 -0.22997643]
[0.   0.   0.   1.   ]]

T_ic: (cam1 to imu0):
[[-0.00528267 0.00076801 0.99998575 0.22948254]
[0.99997372 -0.00496193 0.00528641 0.07461169]
[0.00496592 0.99998739 -0.00074178 -0.1385025]
[0.   0.   0.   1.   ]]

timeshift cam1 to imu0: [s] (t_imu = t_cam + shift)
-0.0143841513651

Baselines:

Baseline (cam0 to cam1):
[[0.99987005 0.00087234 0.01609703 -0.14634816]
[-0.00085561 0.99999909 -0.00104599 -0.00011422]
[-0.01609793 0.00103209 0.99986989 -0.00397526]
[0.   0.   0.   1.   ]]
baseline norm: 0.14640218486 [m]

Gravity vector in target coords: [m/s^2]
[0.7122175 -9.78025578 -0.08812539]

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

cam0

Camera model: pinhole
Focal length: [856.6745650105413, 855.9701915960269]
Principal point: [648.3744117502828, 531.7012993553176]
Distortion model: radtan
Distortion coefficients: [-0.21600279714574364, 0.0916845809666243, 0.00026304634502239126, -0.0010263792903528297]
Type: aprilgrid
Tags:
Rows: 6
Cols: 6
Size: 0.028 [m]
Spacing 0.0084 [m]

cam1

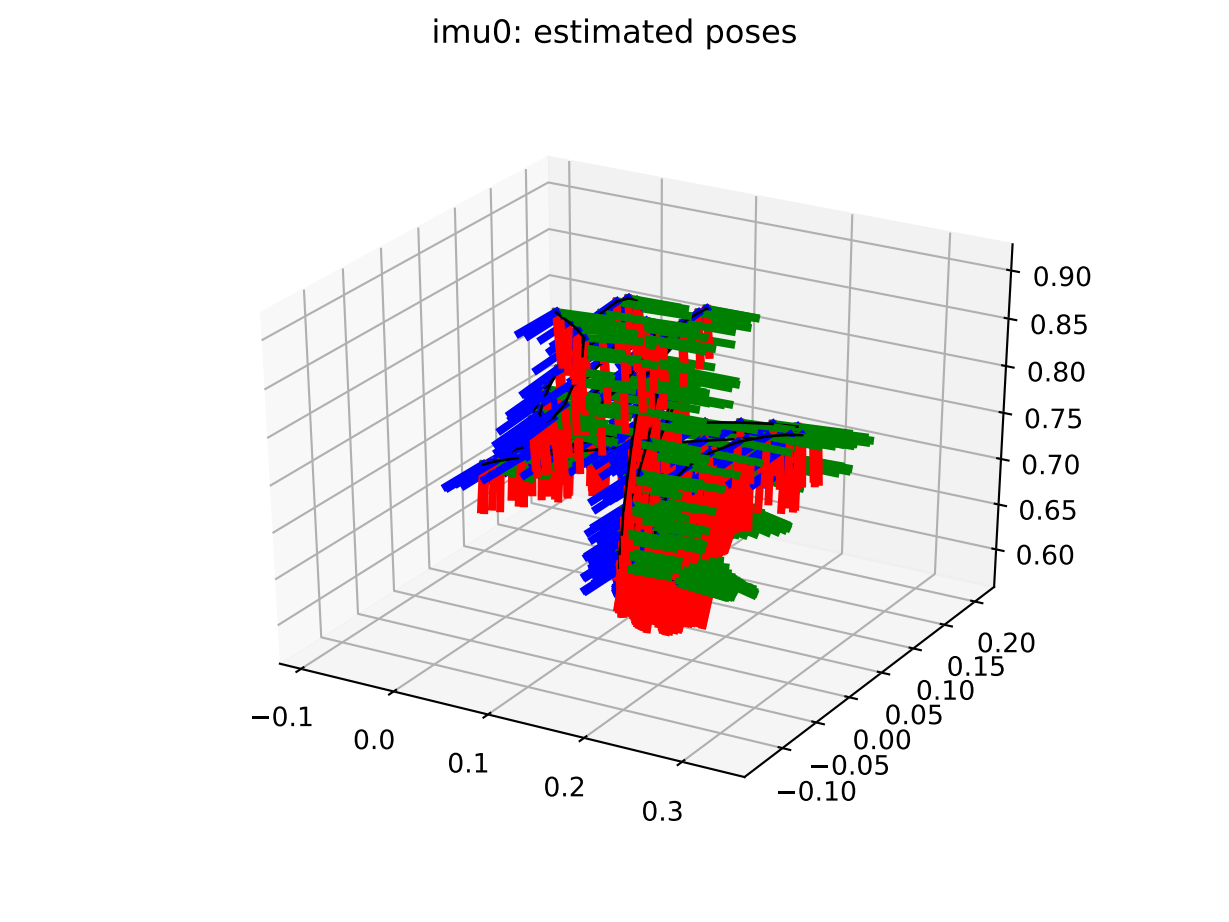
Camera model: pinhole
Focal length: [697.4373599059694, 697.2432225104347]
Principal point: [630.6112434027007, 501.82964716167305]
Distortion model: radtan
Distortion coefficients: [-0.35297306667998285, 0.1393213288049193, -0.0006347454082266885, 6.445552528741295e-05]
Type: aprilgrid
Tags:
Rows: 6
Cols: 6
Size: 0.028 [m]
Spacing 0.0084 [m]

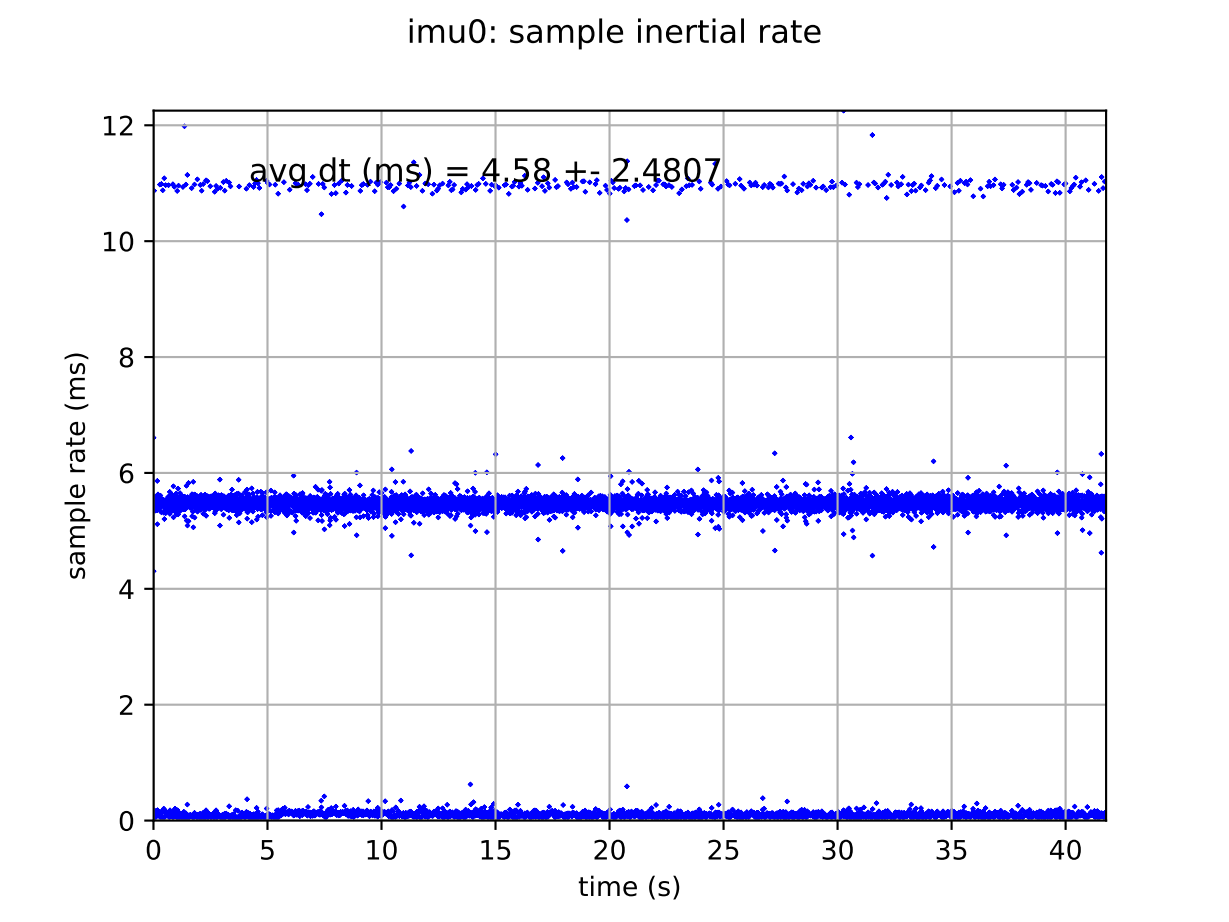
IMU configuration
==========

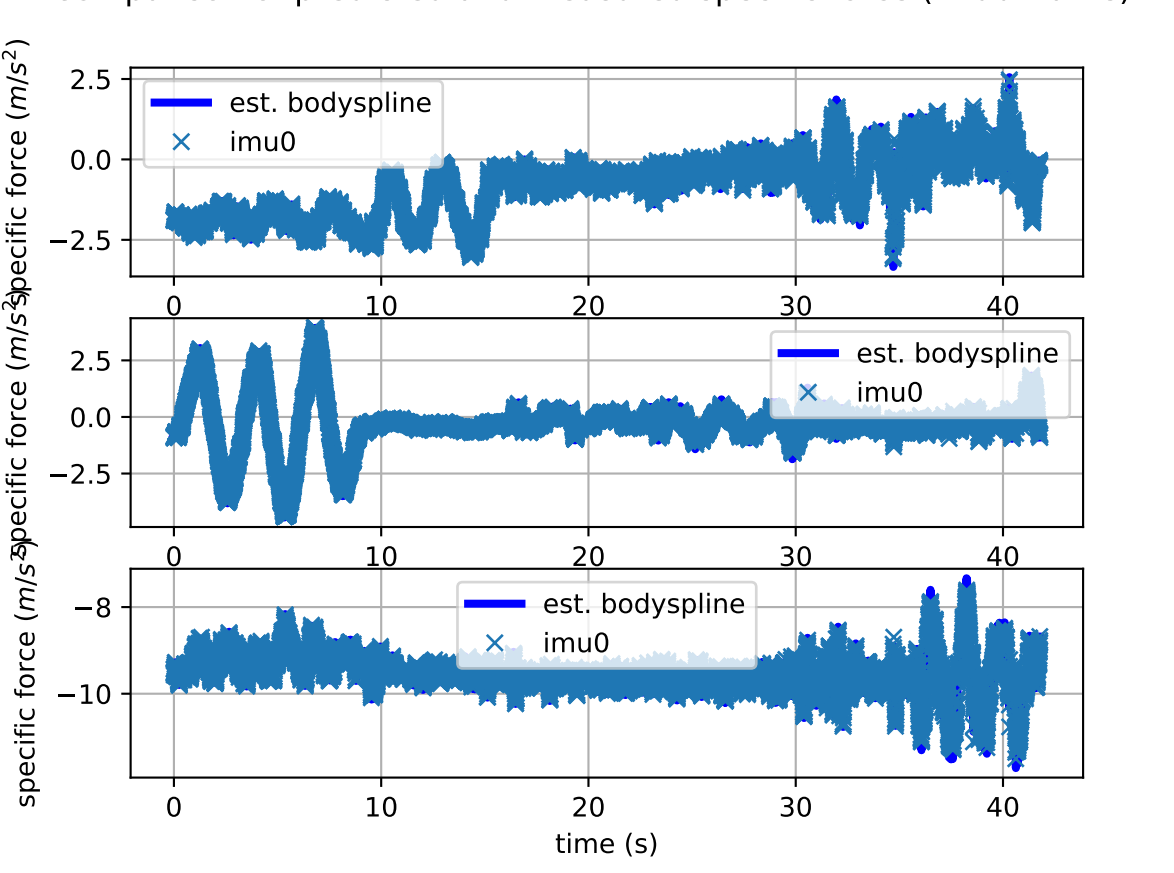
IMU0:

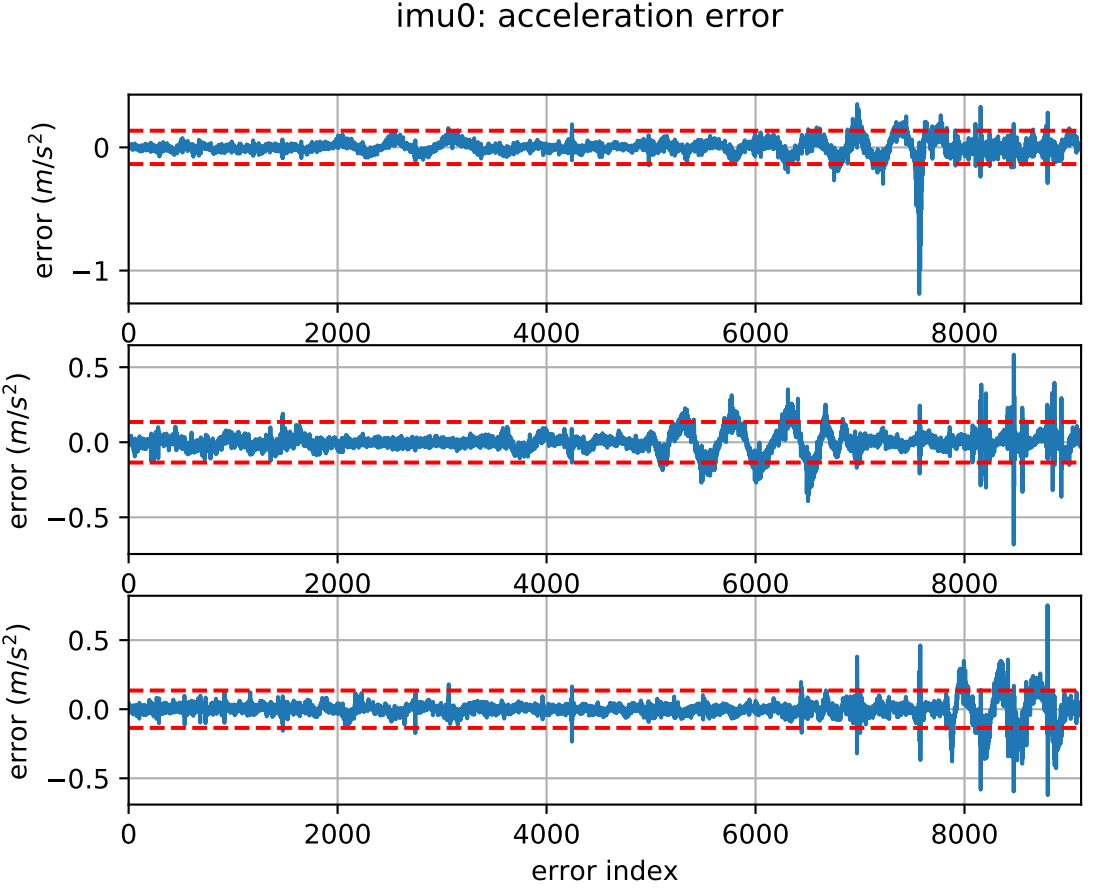
Model: calibrated
Update rate: 200.0

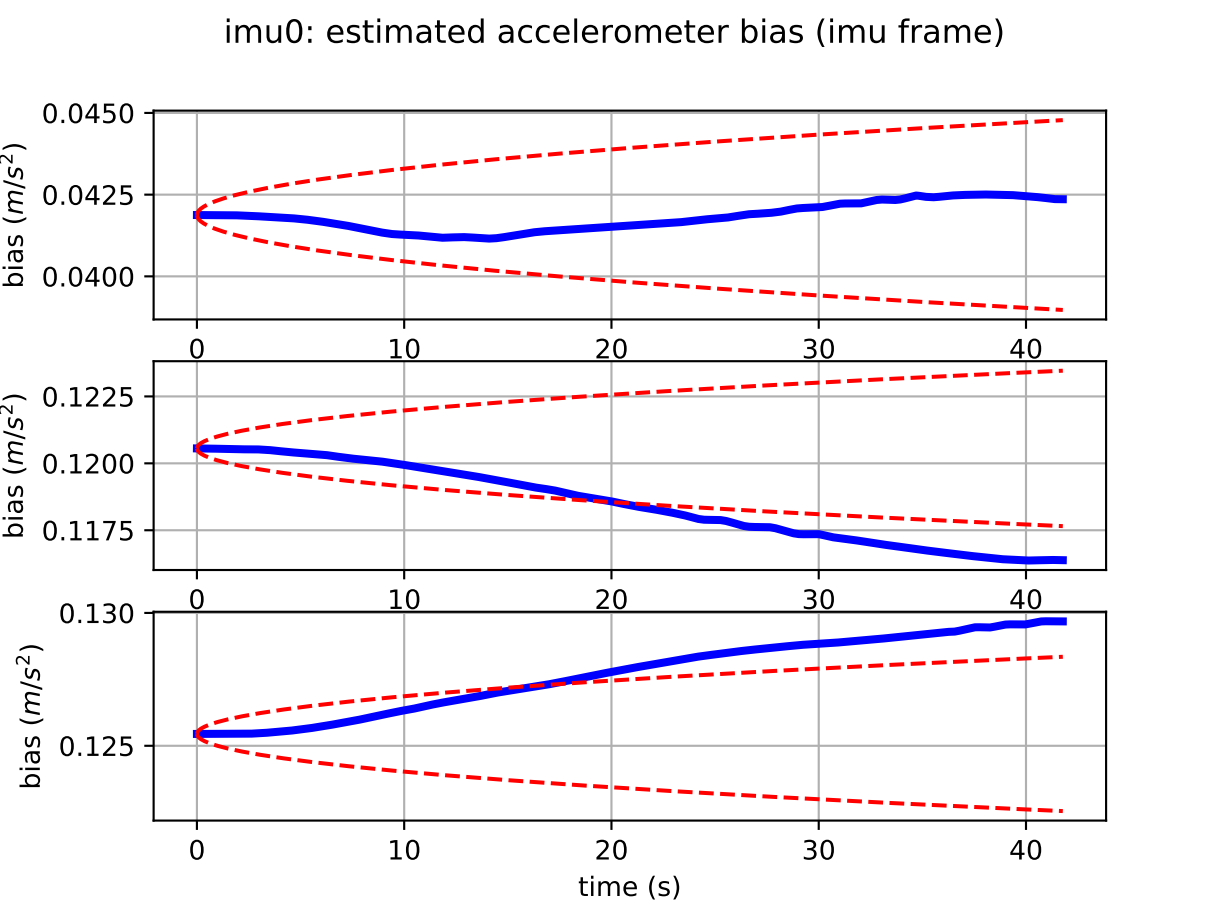
Accelerometer:
Noise density: 0.00318858694719
Noise density (discrete): 0.0450934290553
Random walk: 0.000149751981772
Gyroscope:
Noise density: 0.000241288827878
Noise density (discrete): 0.00341233932835
Random walk: 1.07138531254e-05
T_ib (imu0 to imu0)
[[1. 0. 0. 0.]
[0. 1. 0. 0.]
[0. 0. 1. 0.]
[0. 0. 0. 1.]]
time offset with respect to IMU0: 0.0 [s]

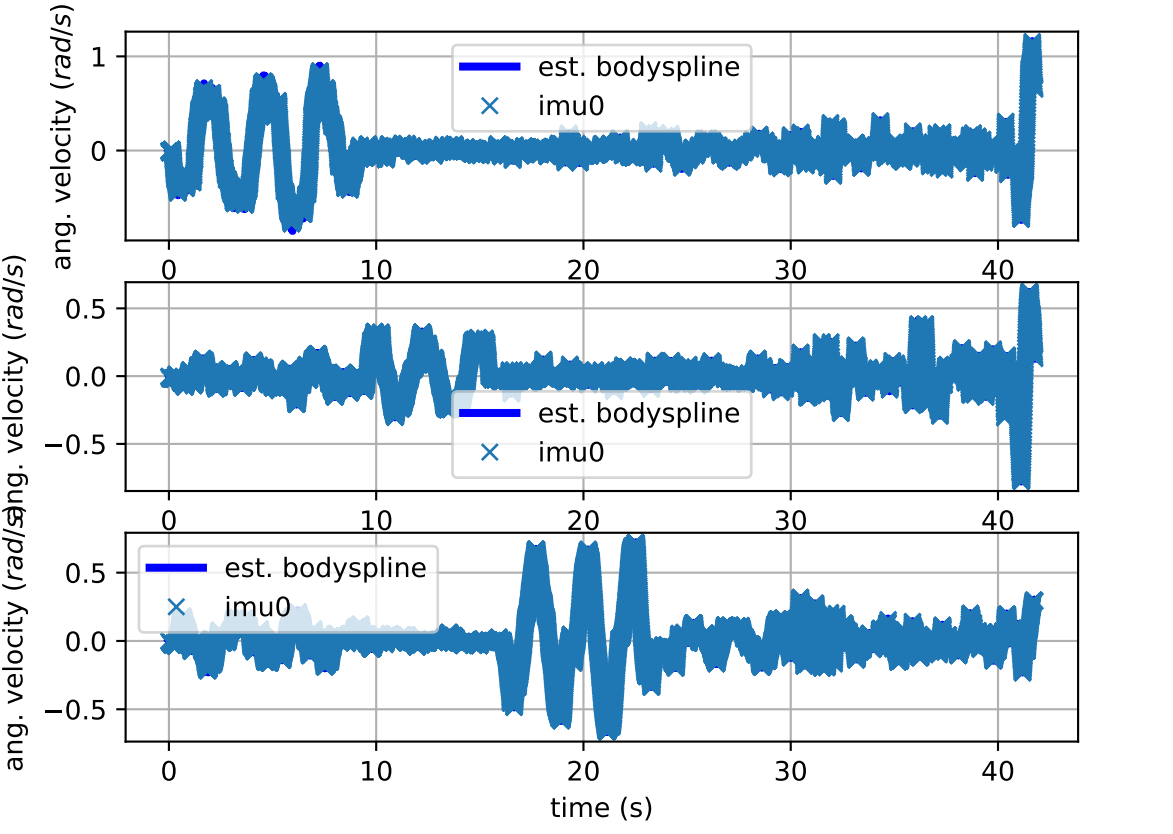

imu0: estimated poses
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
−0.1
0.0
0.1
0.2
0.3

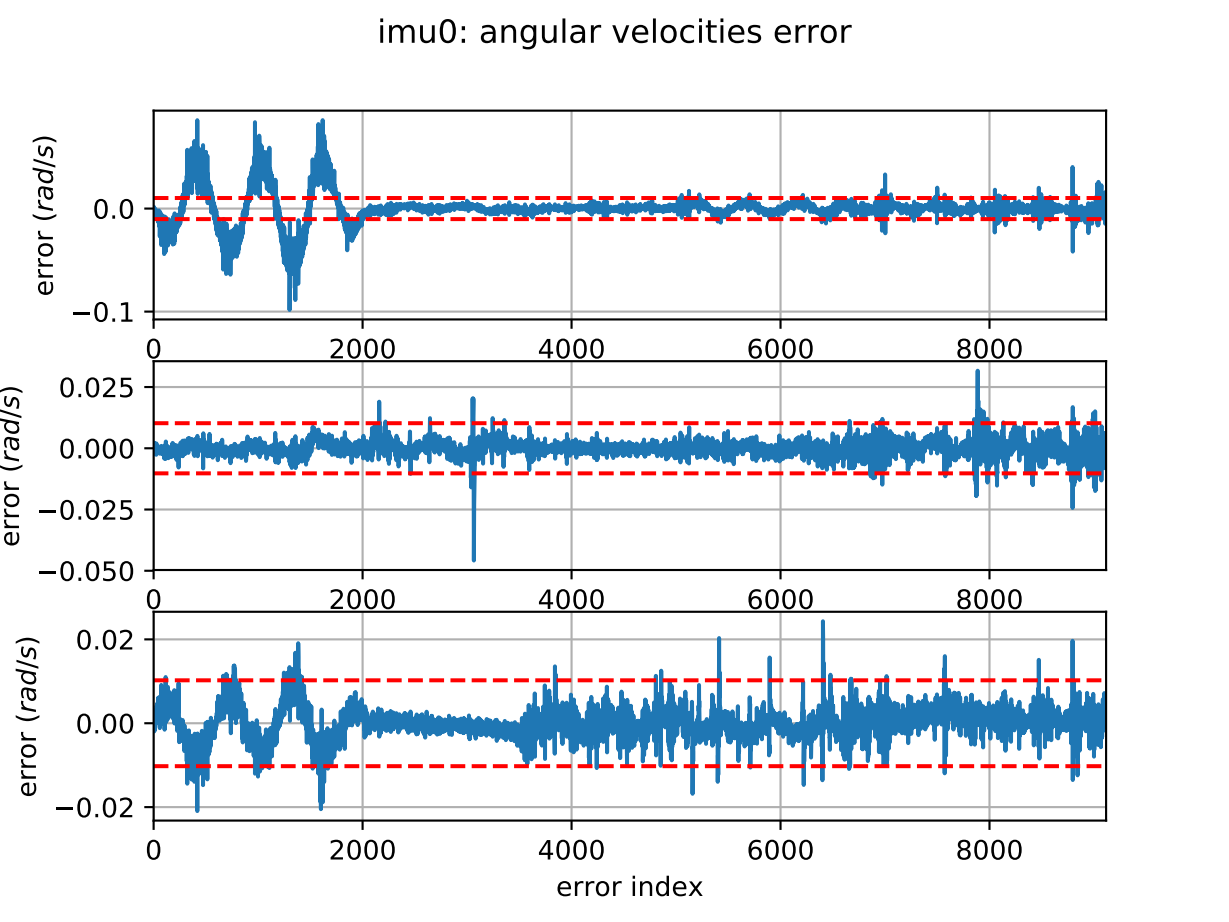

imu0: sample inertial rate
avg dt (ms) = 4.58 +- 2.4807
sample rate (ms)
time (s)
0
2
4
6
8
10
12
0
5
10
15
20
25
30
35
40

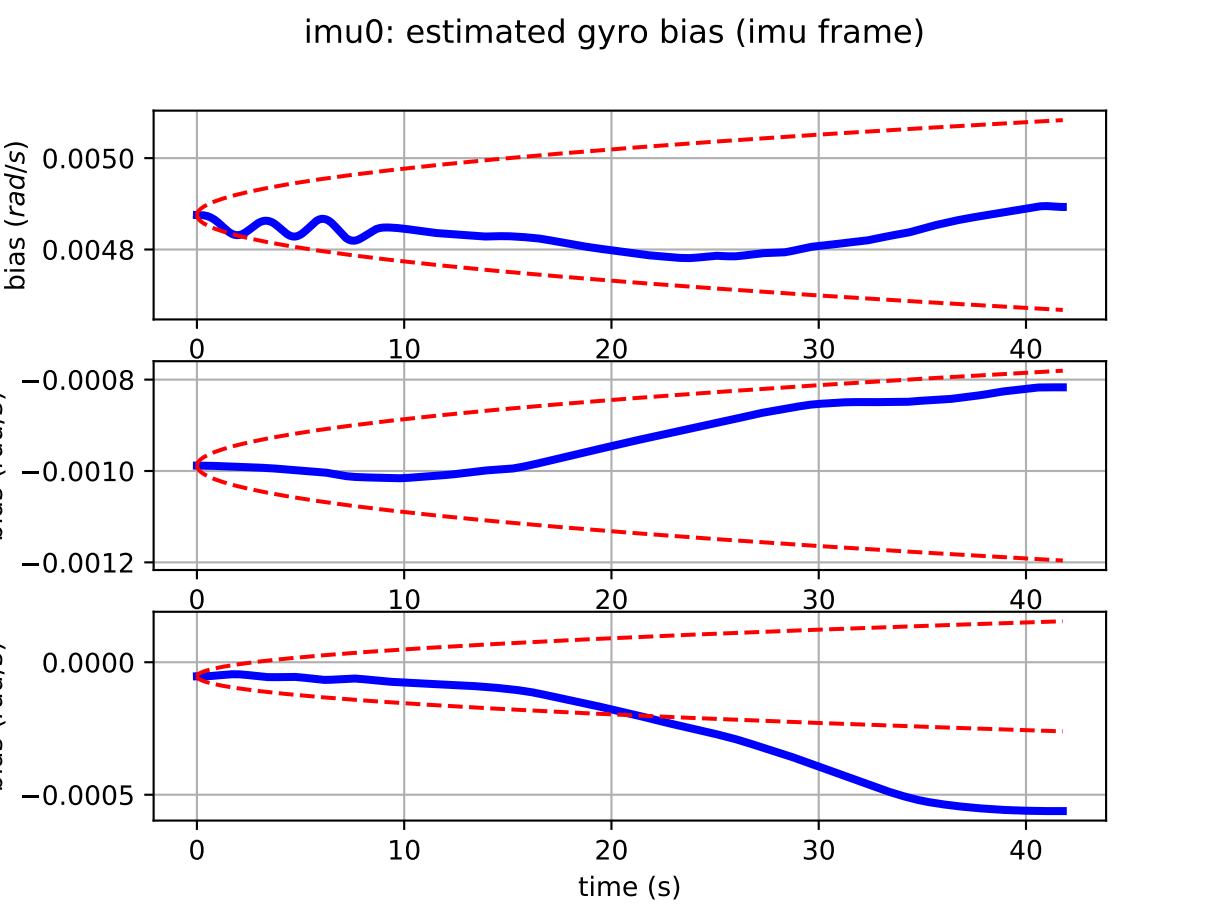

Comparison of predicted and measured specific force (imu0 frame)
specific force (m/s^2)
est. bodyspline
imu0
2.5
0.0
−2.5
0
10
20
30
40
−8
−10
time (s)

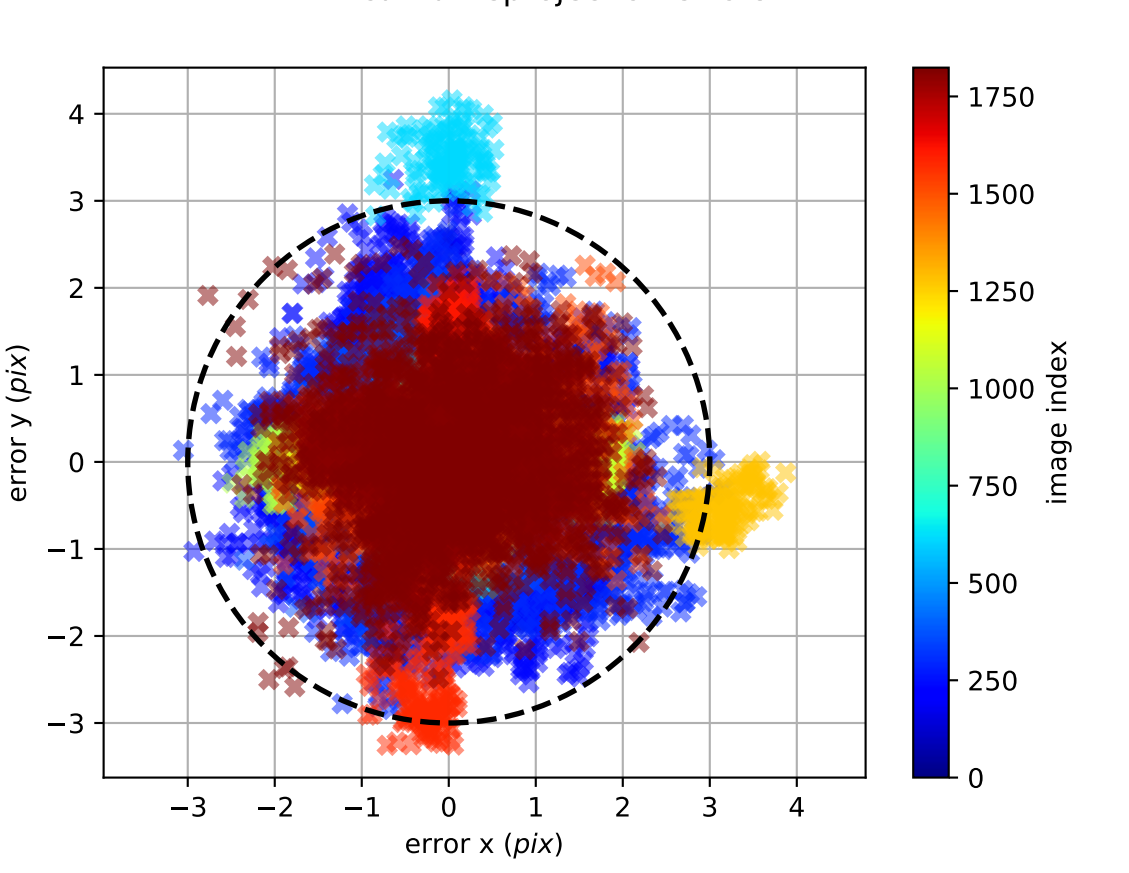

imu0: acceleration error
error (m/s^2)
0
−1
0
2000
4000
6000
8000
error (m/s^2)
0.5
0.0
−0.5
0
2000
4000
6000
8000
error (m/s^2)
0.5
0.0
−0.5
0
2000
4000
6000
8000
error index

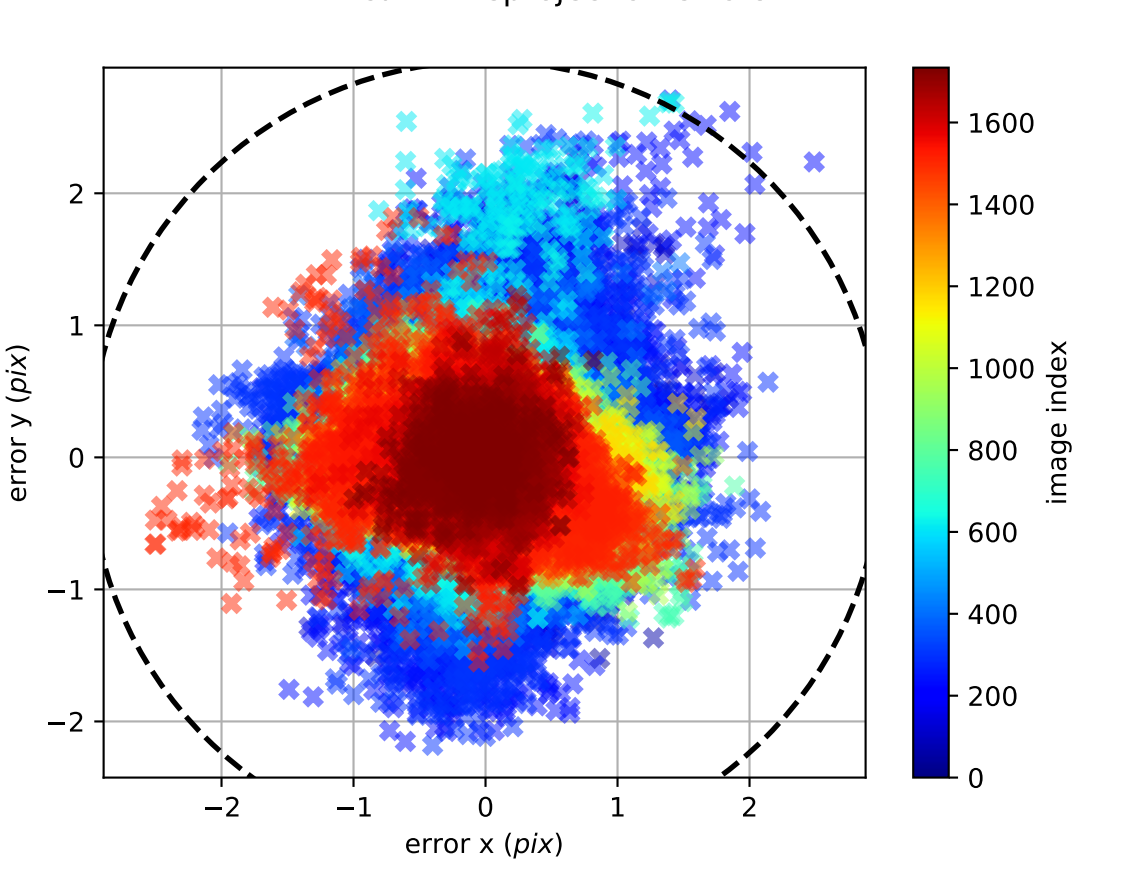

imu0: estimated accelerometer bias (imu frame)
bias (m/s^2)
0.0450
0.0425
0.0400
0
10
20
30
40
bias (m/s^2)
0.1225
0.1200
0.1175
0
10
20
30
40
bias (m/s^2)
0.130
0.125
0
10
20
30
40
time (s)


Comparison of predicted and measured angular velocities (body frame)
ang. velocity (rad/s)
ang. velocity (rad/s)
ang. velocity (rad/s)
est. bodyspline
imu0
est. bodyspline
imu0
est. bodyspline
imu0
1
0
0.5
0.0
−0.5
0.5
0.0
−0.5
0
10
20
30
40
time (s)


imu0: angular velocities error
error (rad/s)
0.0
−0.1
0
2000
4000
6000
8000
error (rad/s)
0.025
0.000
−0.025
−0.050
0
2000
4000
6000
8000
error (rad/s)
0.02
0.00
−0.02
0
2000
4000
6000
8000
error index


imu0: estimated gyro bias (imu frame)
bias (rad/s)
0.0050
0.0048
−0.0008
−0.0010
−0.0012
0.0000
−0.0005
0
10
20
30
40
time (s)


cam0: reprojection errors
error x (pix)
error y (pix)
image index
4
3
2
1
0
−1
−2
−3
−3
−2
−1
0
1
2
3
4
1750
1500
1250
1000
750
500
250
0


cam1: reprojection errors
error x (pix)
error y (pix)
image index
−2
−1
0
1
2
0
200
400
600
800
1000
1200
1400
1600