Calibration results
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Normalized Residuals

Reprojection error (cam0): mean 0.111760336479, median 0.10695732178, std: 0.0555673375133
Reprojection error (cam1): mean 0.11573997365, median 0.110692275962, std: 0.0581800020149
Gyroscope error (imu0): mean 0.050096528731, median 0.0459945176777, std: 0.0311474391082
Accelerometer error (imu0): mean 0.0525057111411, median 0.0477156729148, std: 0.0285736508724

Residuals

Reprojection error (cam0) [px]: mean 0.111760336479, median 0.10695732178, std: 0.0555673375133
Reprojection error (cam1) [px]: mean 0.11573997365, median 0.110692275962, std: 0.0581800020149
Gyroscope error (imu0) [rad/s]: mean 0.00824821965819, median 0.00757283776918, std: 0.00512831779092
Accelerometer error (imu0) [m/s^2]: mean 0.0924007357647, median 0.0839711183605, std: 0.0502845558457

Transformation (cam0):

T_ci: (imu0 to cam0):
[[0.99974473 0.0159588 -0.01599364 0.04757613]
[-0.01602464 0.99986361 -0.0039968   0.00601861]
[0.01592768 0.00425207 0.99986411 0.00270017]
[0.   0.   0.   1.   ]]

T_ic: (cam0 to imu0):
[[0.99974473 -0.01602464 0.01592768 -0.04751054]
[0.0159588   0.99986361 0.00425207 -0.00678853]
[-0.01599364 -0.0039968   0.99986411 -0.00191484]
[0.   0.   0.   1.   ]]

timeshift cam0 to imu0: [s] (t_imu = t_cam + shift)
-0.0016785833977

Transformation (cam1):

T_ci: (imu0 to cam1):
[[0.99996618 -0.0075014 -0.00337036 -0.03297452]
[0.00747406 0.99993963 -0.0080542   0.00702332]
[0.00343058 0.00802874 0.99996188 0.00299824]
[0.   0.   0.   1.   ]]

T_ic: (cam1 to imu0):
[[0.99996618 0.00747406 0.00343058 0.03291062]
[-0.0075014   0.99993963 0.00802874 -0.00729432]
[-0.00337036 -0.0080542   0.99996188 -0.0030527]
[0.   0.   0.   1.   ]]

timeshift cam1 to imu0: [s] (t_imu = t_cam + shift)
-0.00170412251872

Baselines:

Baseline (cam0 to cam1):
[[0.99964511 -0.02351101 0.01252534 -0.08042608]
[0.02355881 0.99971567 -0.00368225 -0.00010447]
[-0.0124352   0.00397602 0.99991477 0.00086599]
[0.   0.   0.   1.   ]]
baseline norm: 0.0804308071667 [m]

Gravity vector in target coords: [m/s^2]
[-9.80616136 -0.0131325   0.08631197]

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

cam0

Camera model: ds
Focal length: [200.8613473392692, 201.14091548356092]
Principal point: [315.62323867381, 199.04803515215116]
DS xi: -0.302213817828
DS alpha: 0.549511488722
Distortion model: none
Distortion coefficients: []
Type: aprilgrid
Tags:
Rows: 6
Cols: 6
Size: 0.0312 [m]
Spacing 0.00959999976 [m]

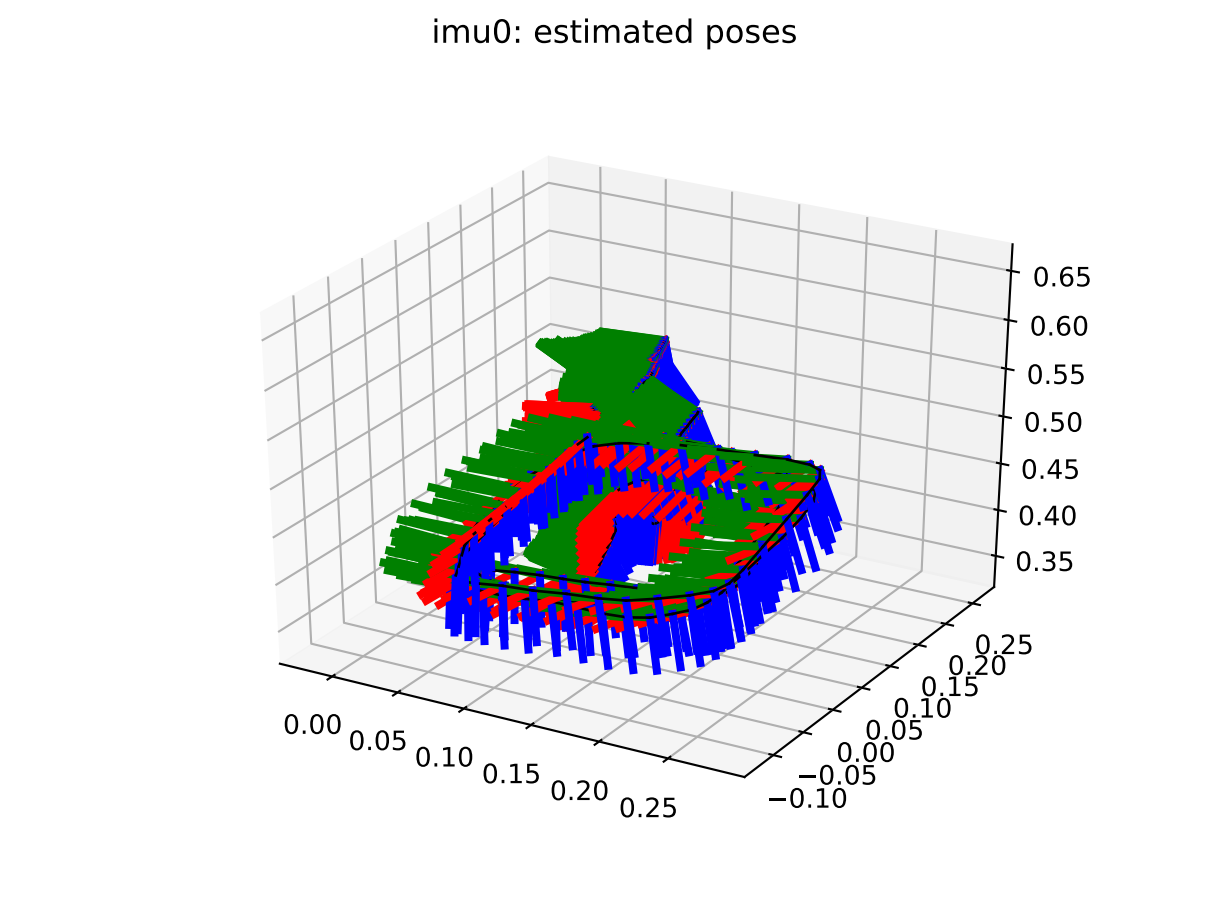
cam1

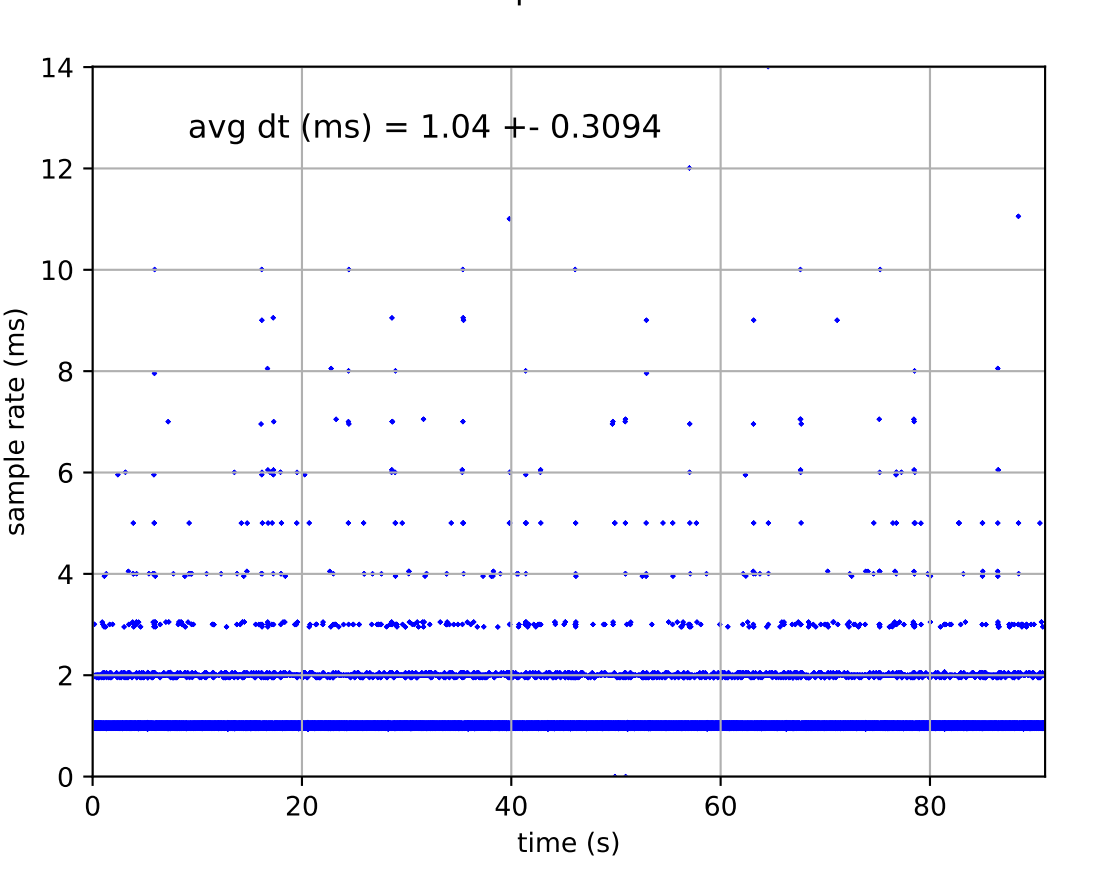
Camera model: ds
Focal length: [200.64308518388555, 201.01427866255517]
Principal point: [315.3444373724974, 198.16793088440872]
DS xi: -0.302900901761
DS alpha: 0.548421703588
Distortion model: none
Distortion coefficients: []
Type: aprilgrid
Tags:
Rows: 6
Cols: 6
Size: 0.0312 [m]
Spacing 0.00959999976 [m]

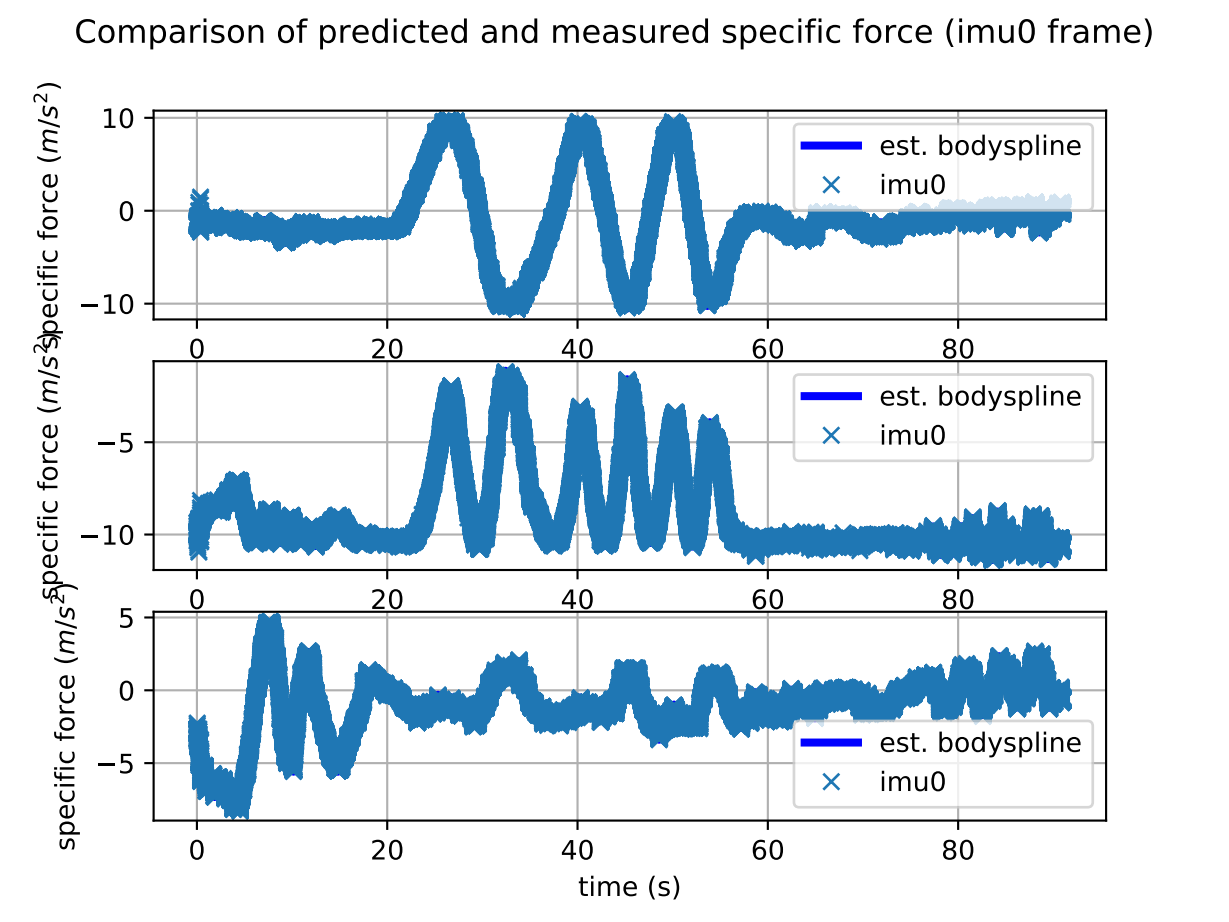
IMU configuration
==========

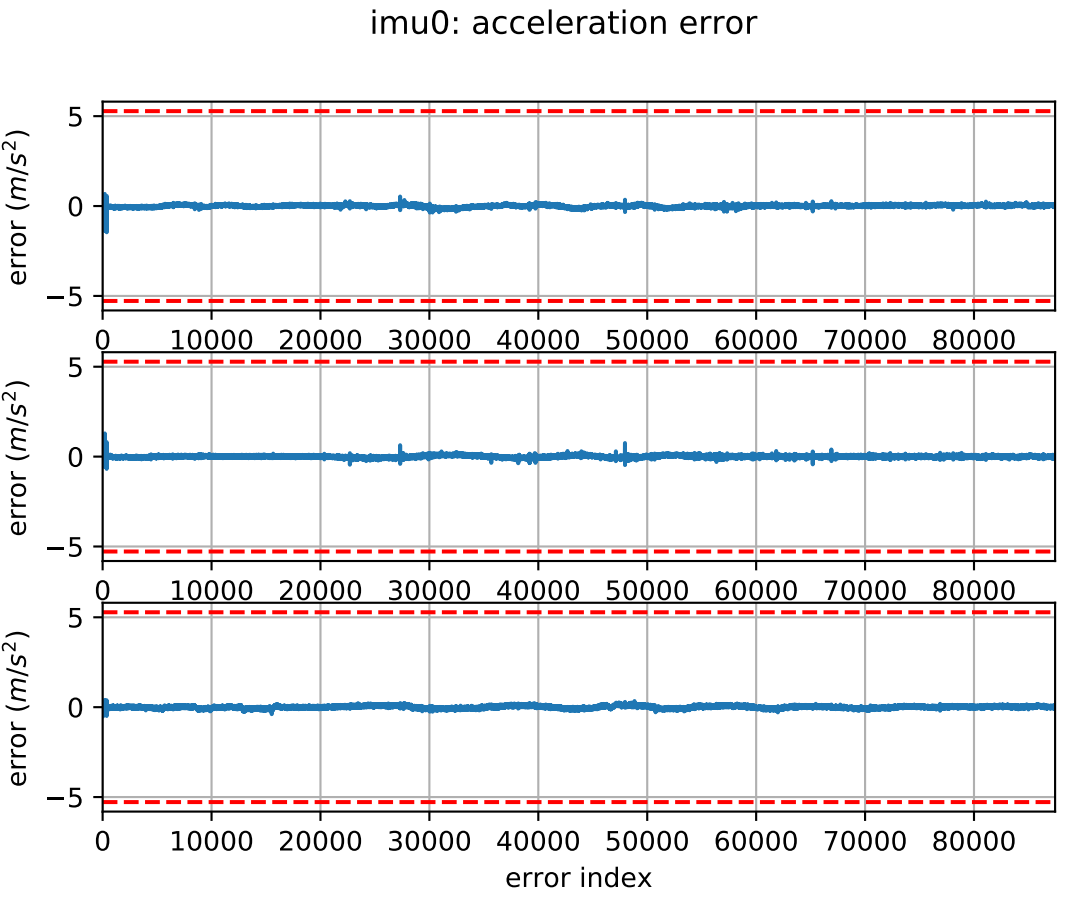
IMU0:

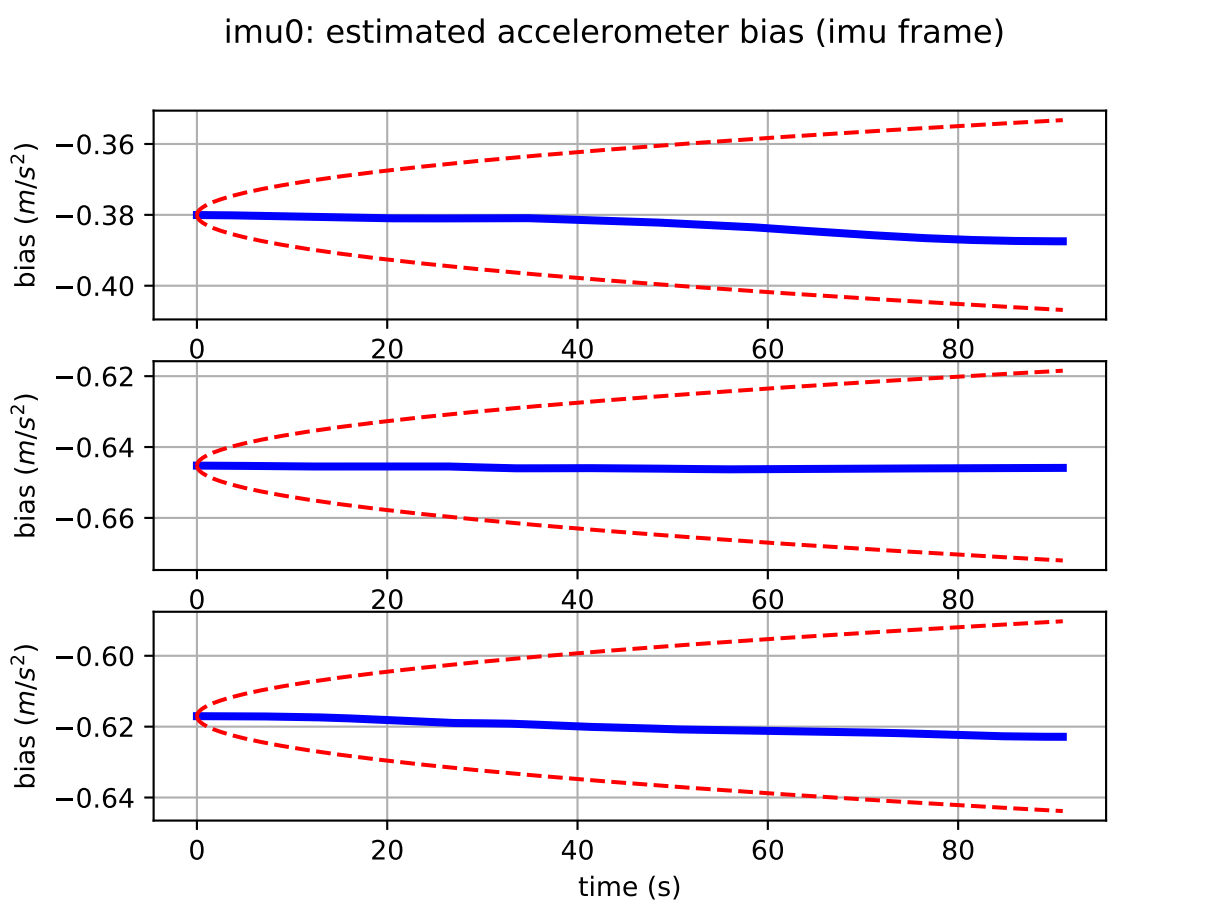
Model: calibrated
Update rate: 1000.0
Accelerometer:
Noise density: 0.055650476137
Noise density (discrete): 1.75982257466
Random walk: 0.000935944634767
Gyroscope:
Noise density: 0.00520658046016
Noise density (discrete): 0.16464653075
Random walk: 9.79101890858e-05
T_ib (imu0 to imu0)
[[1. 0. 0. 0.]
[0. 1. 0. 0.]
[0. 0. 1. 0.]
[0. 0. 0. 1.]]
time offset with respect to IMU0: 0.0 [s]

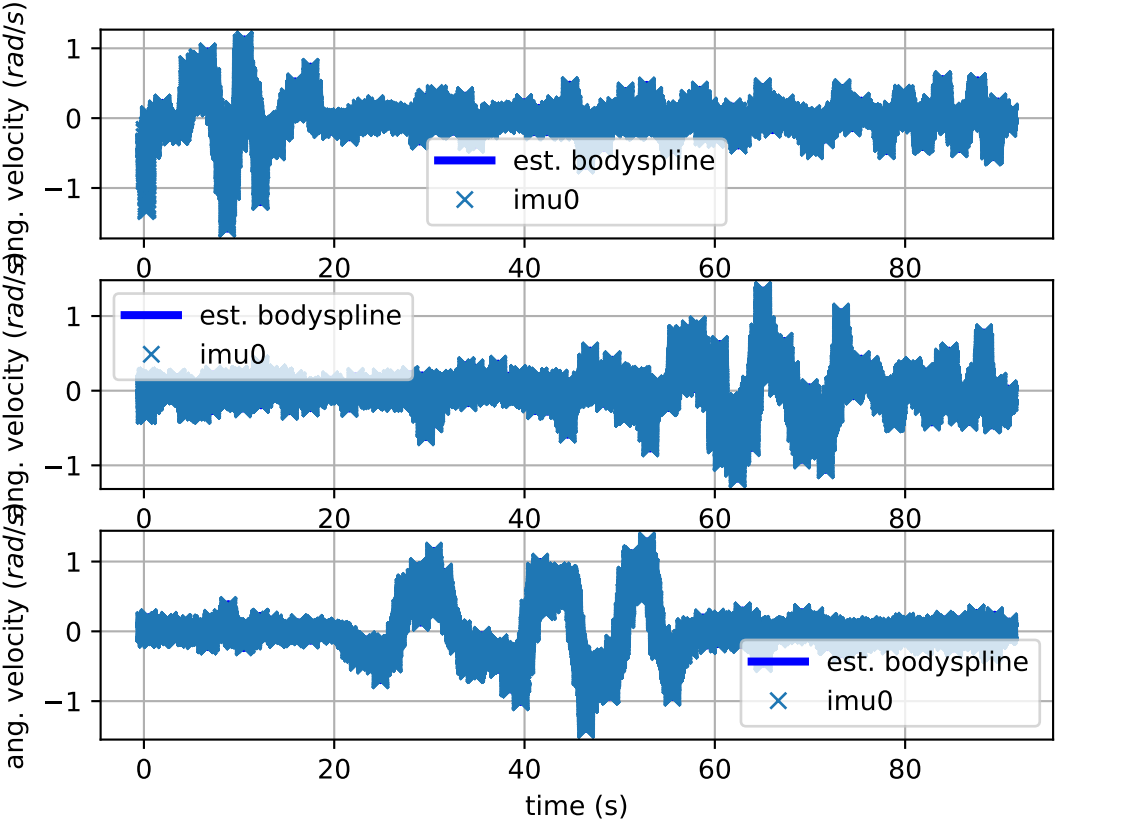

imu0: estimated poses
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
0.00
0.05
0.10
0.15
0.20
0.25

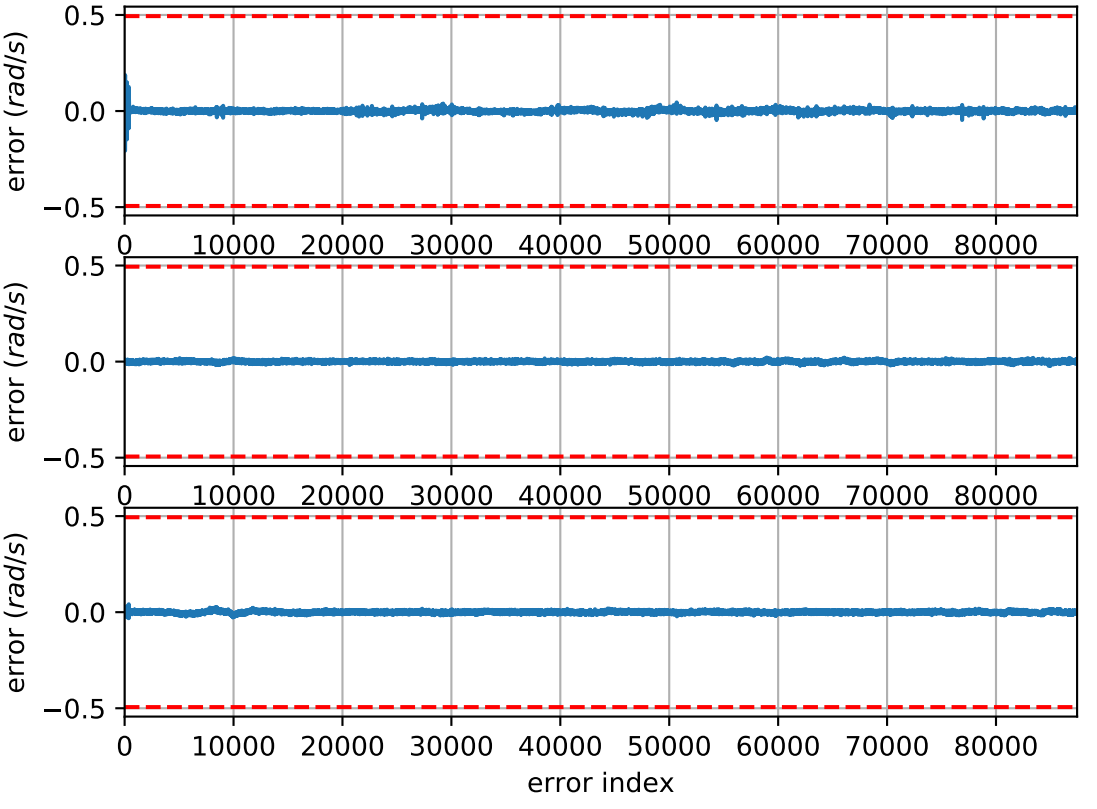

imu0: sample inertial rate
avg dt (ms) = 1.04 +- 0.3094
sample rate (ms)
time (s)
0
2
4
6
8
10
12
14
0
20
40
60
80

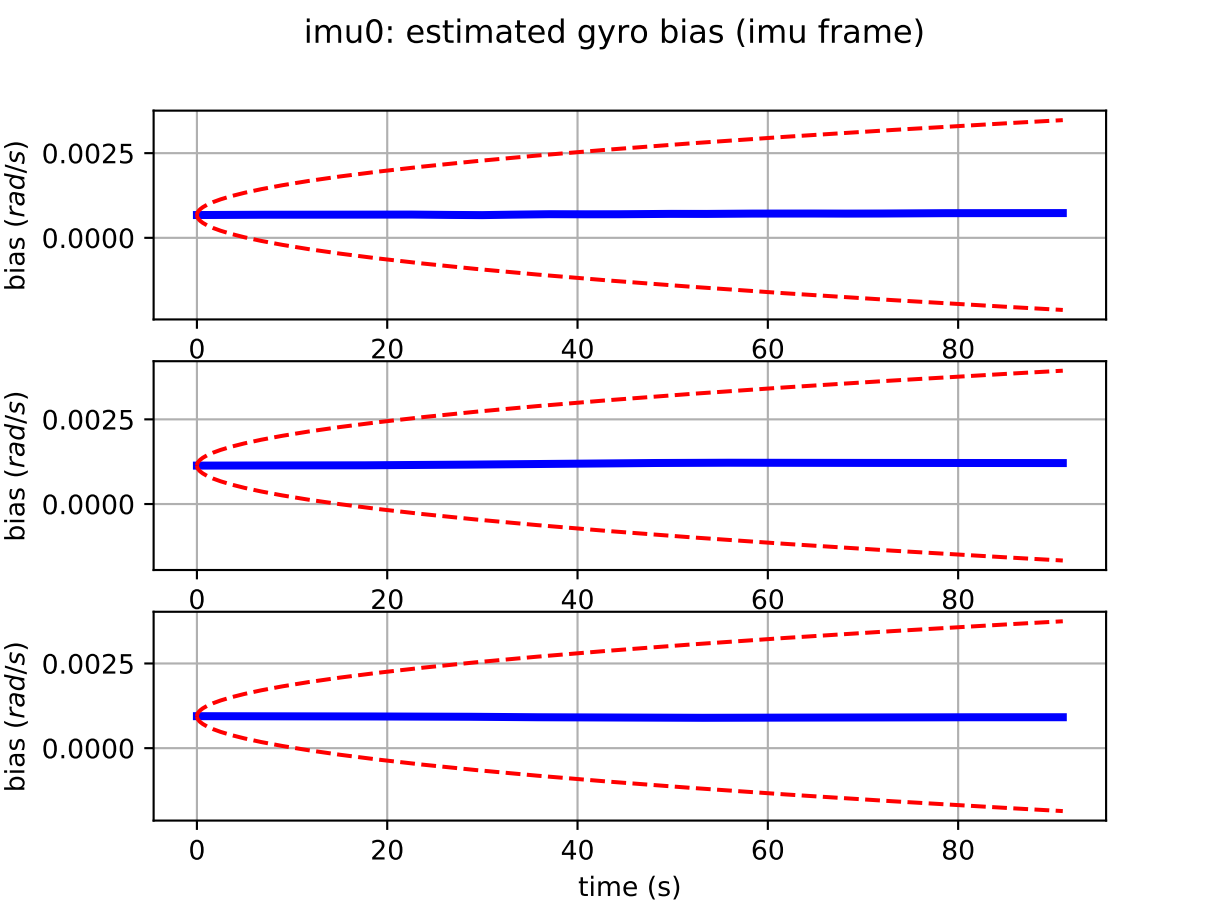

Comparison of predicted and measured specific force (imu0 frame)
specific force (m/s^2)
specific force (m/s^2)
specific force (m/s^2)
time (s)
est. bodyspline
imu0
est. bodyspline
imu0
est. bodyspline
imu0
10
0
−10
−5
−10
5
0
−5
0
20
40
60
80

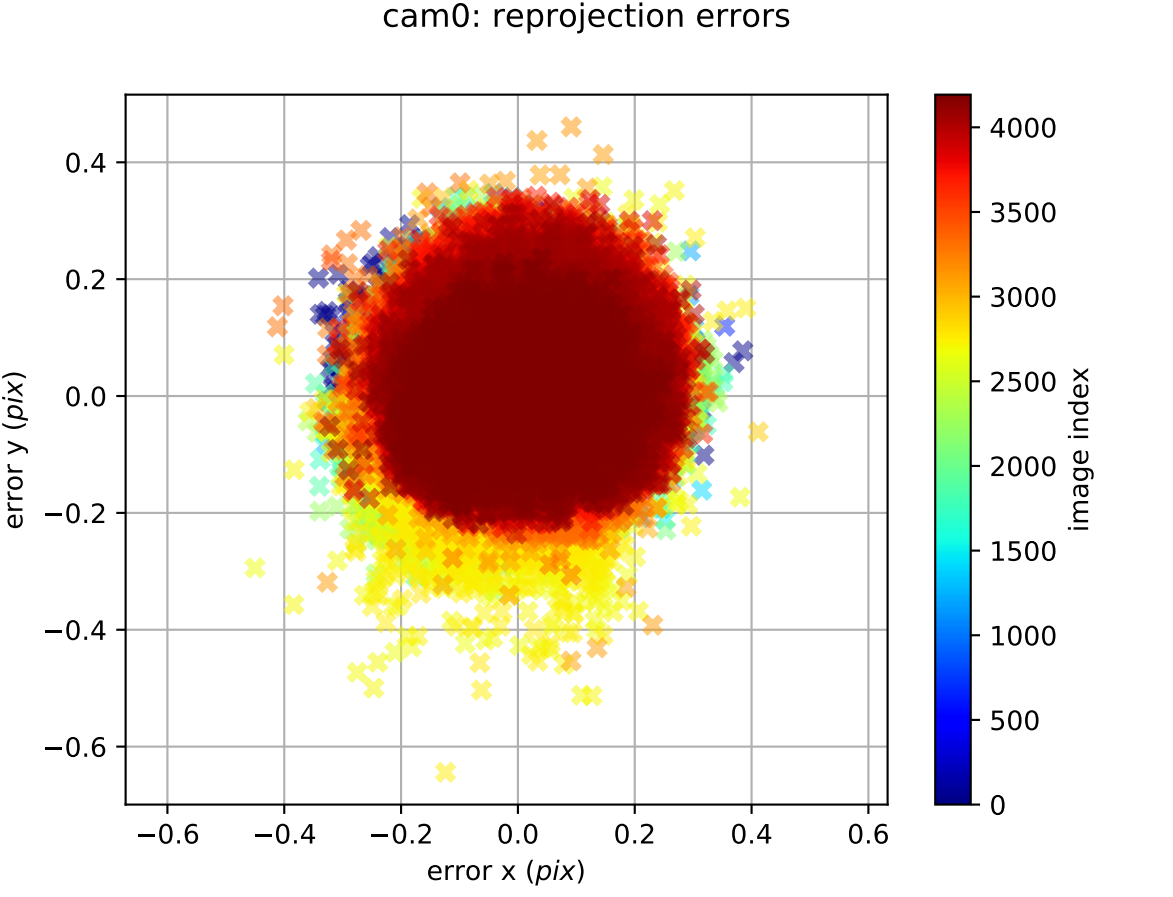

imu0: acceleration error
error (m/s^2)
5
0
−5
0
10000
20000
30000
40000
50000
60000
70000
80000
error index

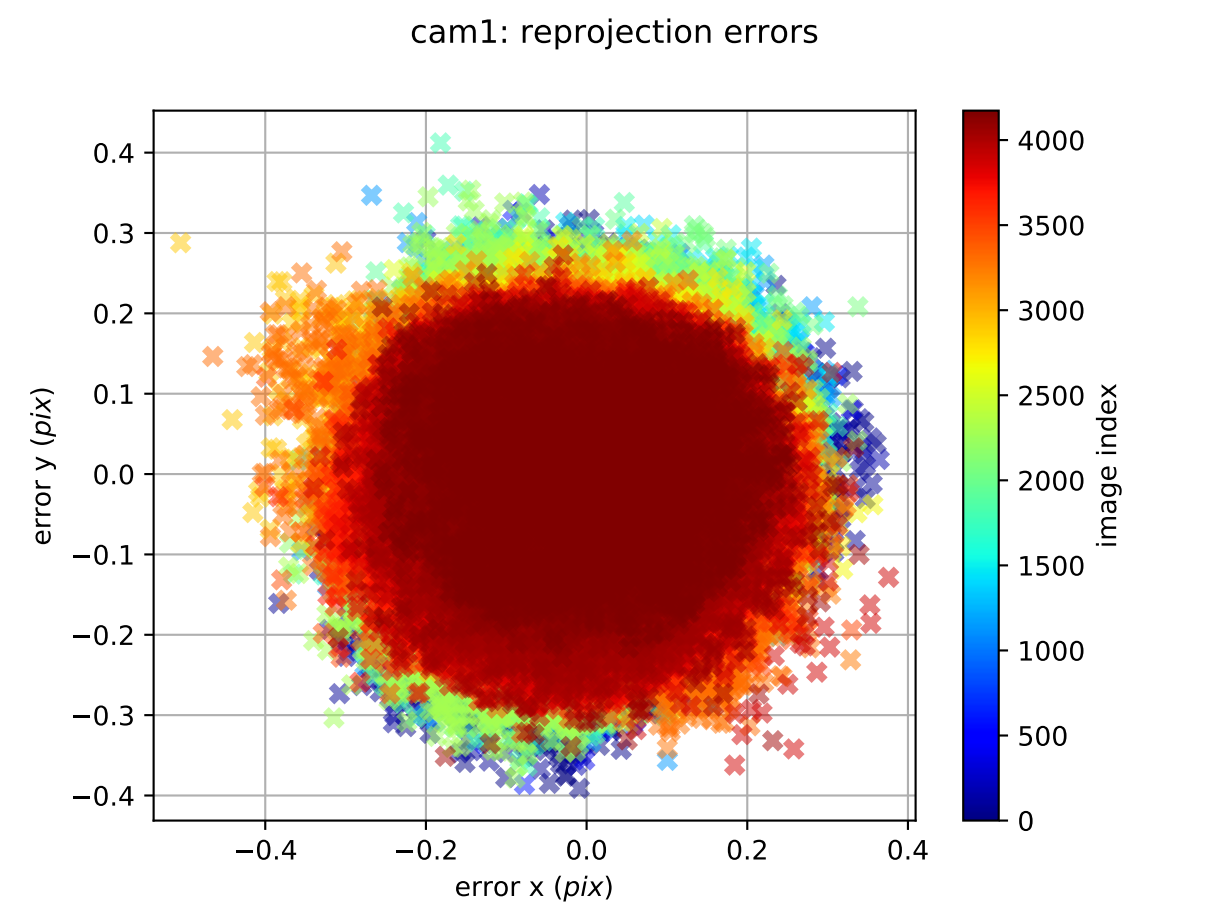

imu0: estimated accelerometer bias (imu frame)
bias (m/s^2)
−0.36
−0.38
−0.40
0
20
40
60
80
bias (m/s^2)
−0.62
−0.64
−0.66
0
20
40
60
80
bias (m/s^2)
−0.60
−0.62
−0.64
0
20
40
60
80
time (s)


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
−1
0
20
40
60
80
time (s)


imu0: angular velocities error
error (rad/s)
0.5
0.0
−0.5
0
10000
20000
30000
40000
50000
60000
70000
80000
error index


imu0: estimated gyro bias (imu frame)
bias (rad/s)
0.0025
0.0000
0
20
40
60
80
bias (rad/s)
0.0025
0.0000
0
20
40
60
80
bias (rad/s)
0.0025
0.0000
0
20
40
60
80
time (s)


cam0: reprojection errors
error x (pix)
error y (pix)
image index
0.4
0.2
0.0
−0.2
−0.4
−0.6
−0.6
−0.4
−0.2
0.0
0.2
0.4
0.6
4000
3500
3000
2500
2000
1500
1000
500
0


cam1: reprojection errors
error x (pix)
error y (pix)
image index
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.4
−0.4
−0.2
0.0
0.2
0.4
4000
3500
3000
2500
2000
1500
1000
500
0