

Calibration results

Normalized Residuals

Reprojection error (cam0): mean 0.25738423378977765, median 0.21983737946894014, std: 0.17914296623521023
Reprojection error (cam1): mean 0.2380955537999951, median 0.19907845955282522, std: 0.17273651473575255
Gyroscope error (imu0): mean 0.18303162502658687, median 0.12949494132639205, std: 0.18098524203159785
Accelerometer error (imu0): mean 0.31080882633449947, median 0.26567291722607905, std: 0.22845209565161995

Residuals

Reprojection error (cam0) [px]: mean 0.25738423378977765, median 0.21983737946894014, std: 0.17914296623521023
Reprojection error (cam1) [px]: mean 0.2380955537999951, median 0.19907845955282522, std: 0.17273651473575255
Gyroscope error (imu0) [rad/s]: mean 0.0007973482822189215, median 0.0005641241998897208, std: 0.0007884335388483181
Accelerometer error (imu0) [m/s^2]: mean 0.02175661784341496, median 0.018597104205825533, std: 0.015991646695613395

Transformation (cam0):

T_ci: (imu0 to cam0):

```
[[-0.00120697 -0.99995955  0.0089126  0.02374102]
 [ 0.00123534 -0.00891409 -0.99995951  0.00198719]
 [ 0.99999851 -0.00119591  0.00124604 -0.00496945]
 [ 0.          0.          1.          ]]
```

T_ic: (cam0 to imu0):

```
[[-0.00120697  0.00123534  0.99999851  0.00499565]
 [-0.99995955 -0.00891409 -0.00119591  0.02375183]
 [ 0.0089126 -0.99995951  0.00124604  0.00178171]
 [ 0.          0.          1.          ]]
```

timeshift cam0 to imu0: [s] (t_imu = t_cam + shift)
0.008473177395364007

Transformation (cam1):

T_ci: (imu0 to cam1):
[[0.00768861 -0.9999287 0.00913635 -0.0958256]
[0.00123689 -0.00912711 -0.99995758 0.00207214]
[0.99996968 0.00769958 0.00116663 -0.00479282]
[0. 0. 0. 1.]]

T_ic: (cam1 to imu0):
[[0.00768861 0.00123689 0.99996968 0.00552688]
[-0.9999287 -0.00912711 0.00769958 -0.09576295]
[0.00913635 -0.99995758 0.00116663 0.00295314]
[0. 0. 0. 1.]]

timeshift cam1 to imu0: [s] (t_imu = t_cam + shift)
0.008706209697421906

Baselines:

Baseline (cam0 to cam1):
[[0.99996041 -0.00021303 0.0088958 -0.11952105]
[0.00021302 0.99999998 0.00000182 0.0000799]
[-0.0088958 0.00000008 0.99996043 0.00038763]
[0. 0. 0. 1.]]
baseline norm: 0.11952170182701408 [m]

Gravity vector in target coords: [m/s^2]
[-0.20770717 -9.78376751 -0.63495987]

Calibration configuration

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cam0

Camera model: pinhole
Focal length: [265.2469730106612, 265.1706733941397]
Principal point: [324.0751634682265, 179.052603741445]
Distortion model: radtan
Distortion coefficients: [0.012629536734776903, -0.0029847400633416002, 0.0004756101990056264, 0.0013932113521388358]
Type: aprilgrid
Tags:
Rows: 6
Cols: 6
Size: 0.0445 [m]
Spacing 0.013171999999999998 [m]

cam1

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Camera model: pinhole
Focal length: [265.35803772722693, 265.1984095544947]
Principal point: [321.4577444733087, 178.82754834304095]
Distortion model: radtan
Distortion coefficients: [0.01174266096331323, -0.002871545099490877, 0.0003592577237750942, -0.0009810431894111654]
Type: aprilgrid
Tags:
Rows: 6
Cols: 6
Size: 0.0445 [m]
Spacing 0.013171999999999998 [m]

IMU configuration

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IMU0:

Model: calibrated
Update rate: 100.0

Accelerometer:

Noise density: 0.007

Noise density (discrete): 0.0699999999999999

Random walk: 0.0008

Gyroscope:

Noise density: 0.00043563416

Noise density (discrete): 0.0043563416

Random walk: 0.007400195811015464

T_{ib} (imu0 to imu0)

$\begin{bmatrix} 1. & 0. & 0. & 0. \end{bmatrix}$

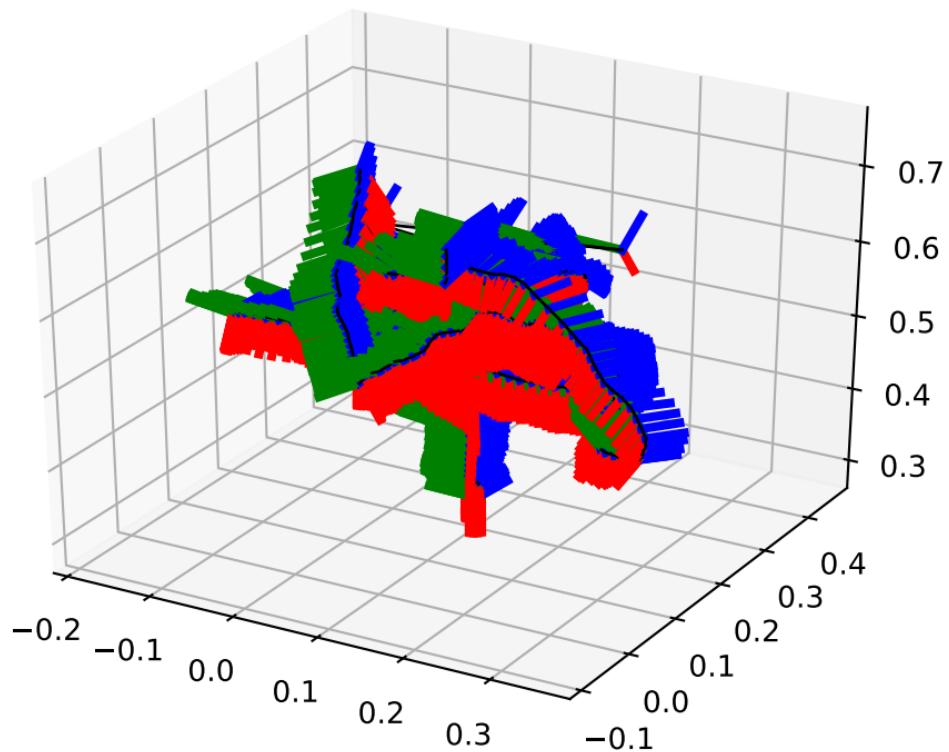
$\begin{bmatrix} 0. & 1. & 0. & 0. \end{bmatrix}$

$\begin{bmatrix} 0. & 0. & 1. & 0. \end{bmatrix}$

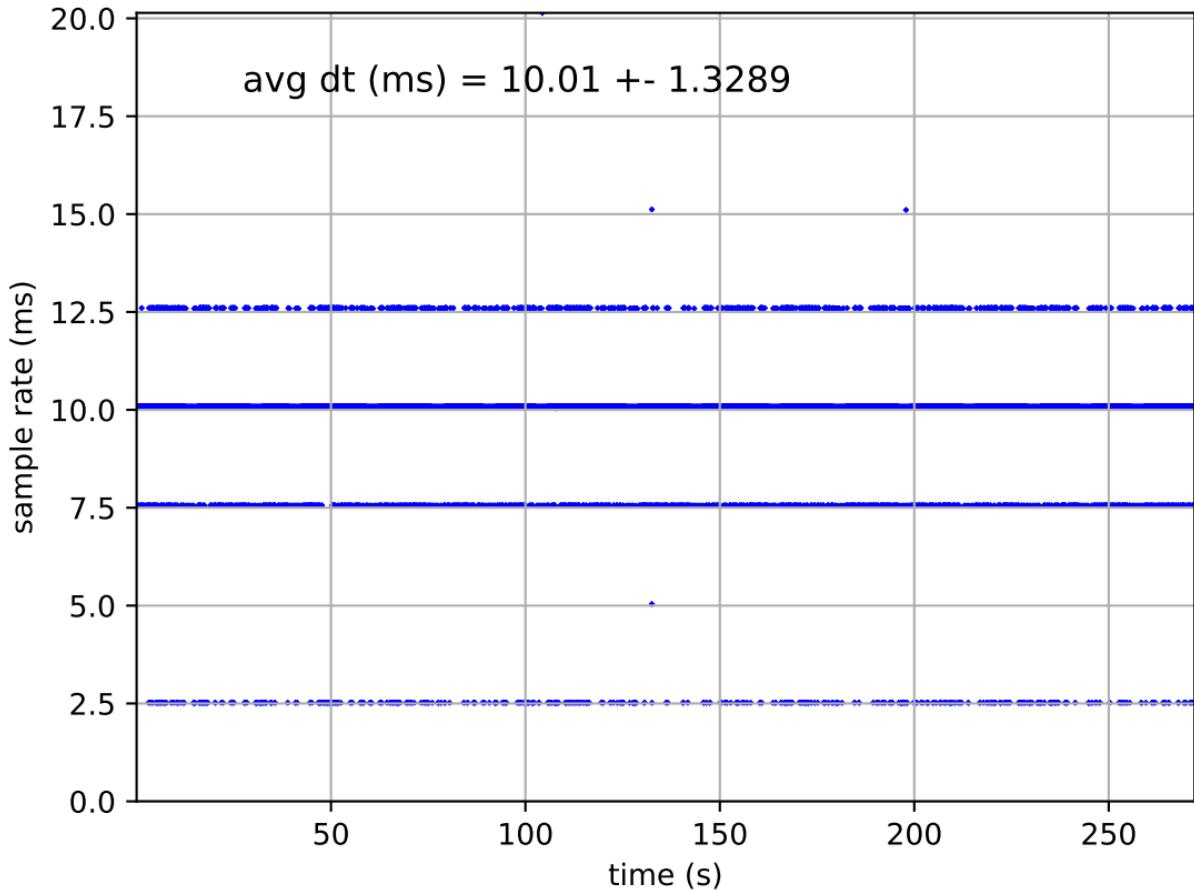
$\begin{bmatrix} 0. & 0. & 0. & 1. \end{bmatrix}$

time offset with respect to IMU0: 0.0 [s]

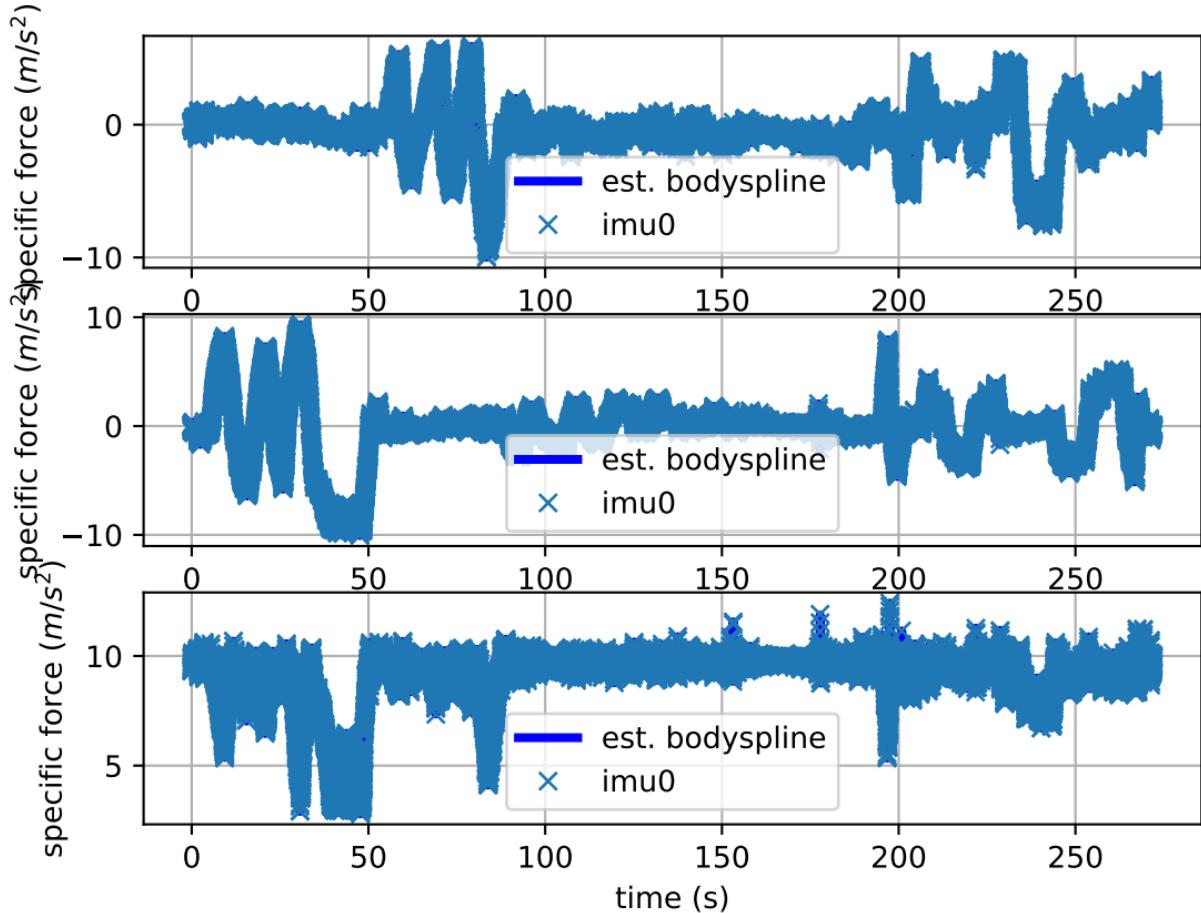
imu0: estimated poses



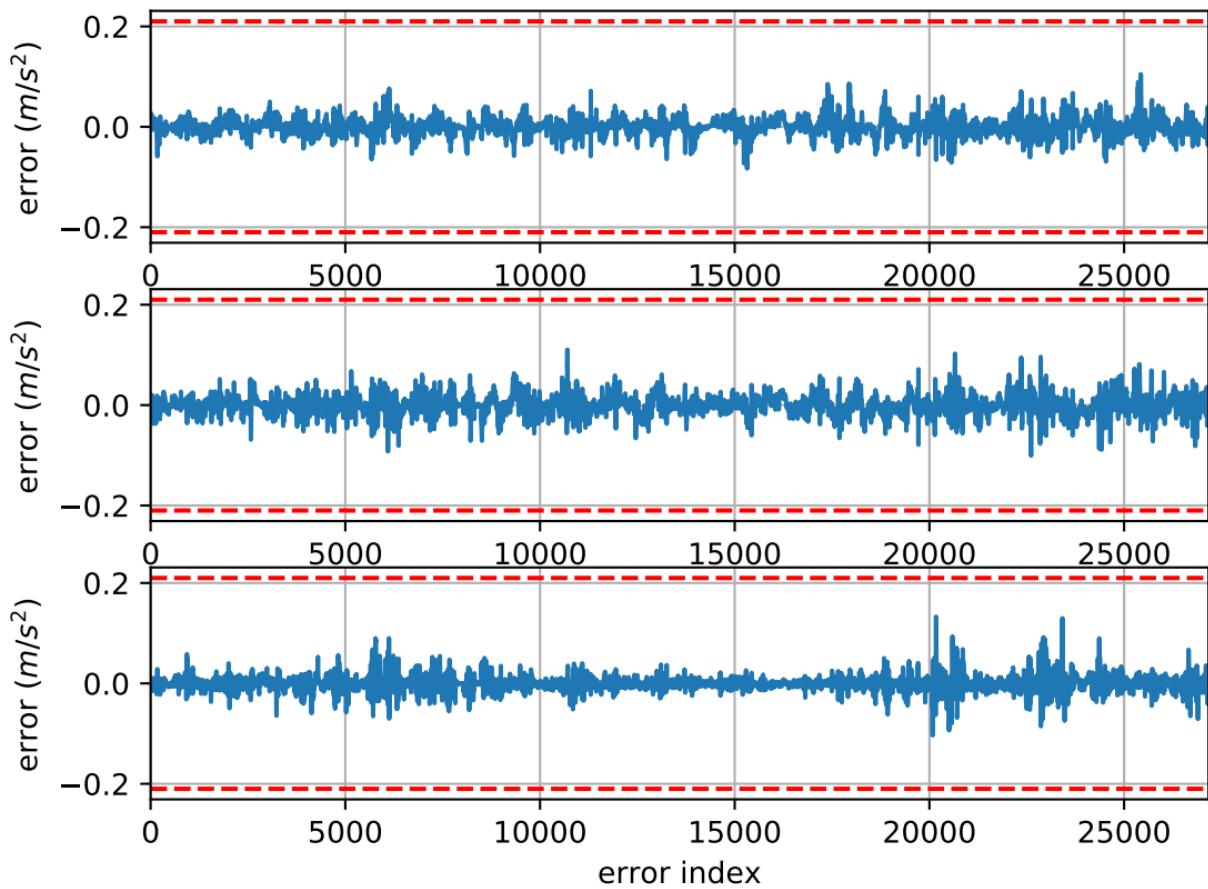
imu0: sample inertial rate



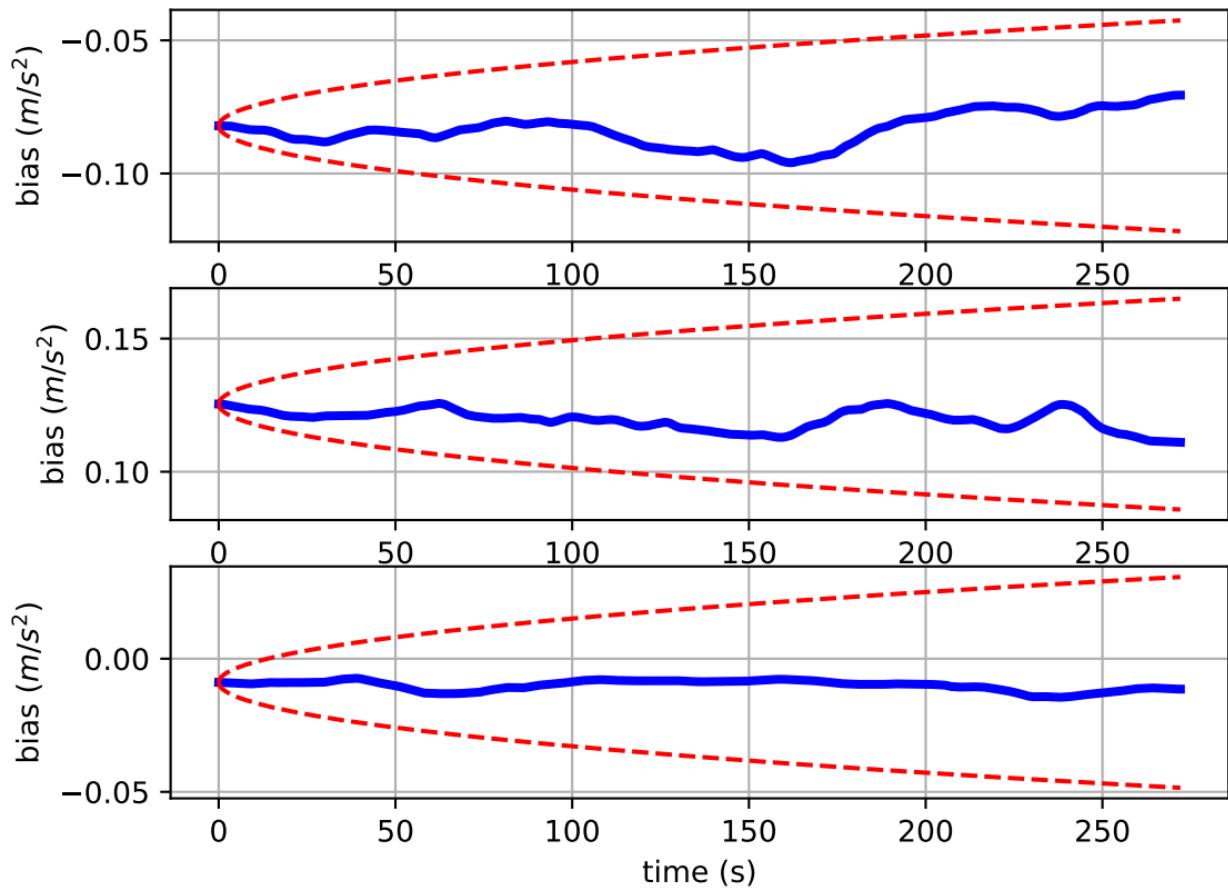
Comparison of predicted and measured specific force (imu0 frame)



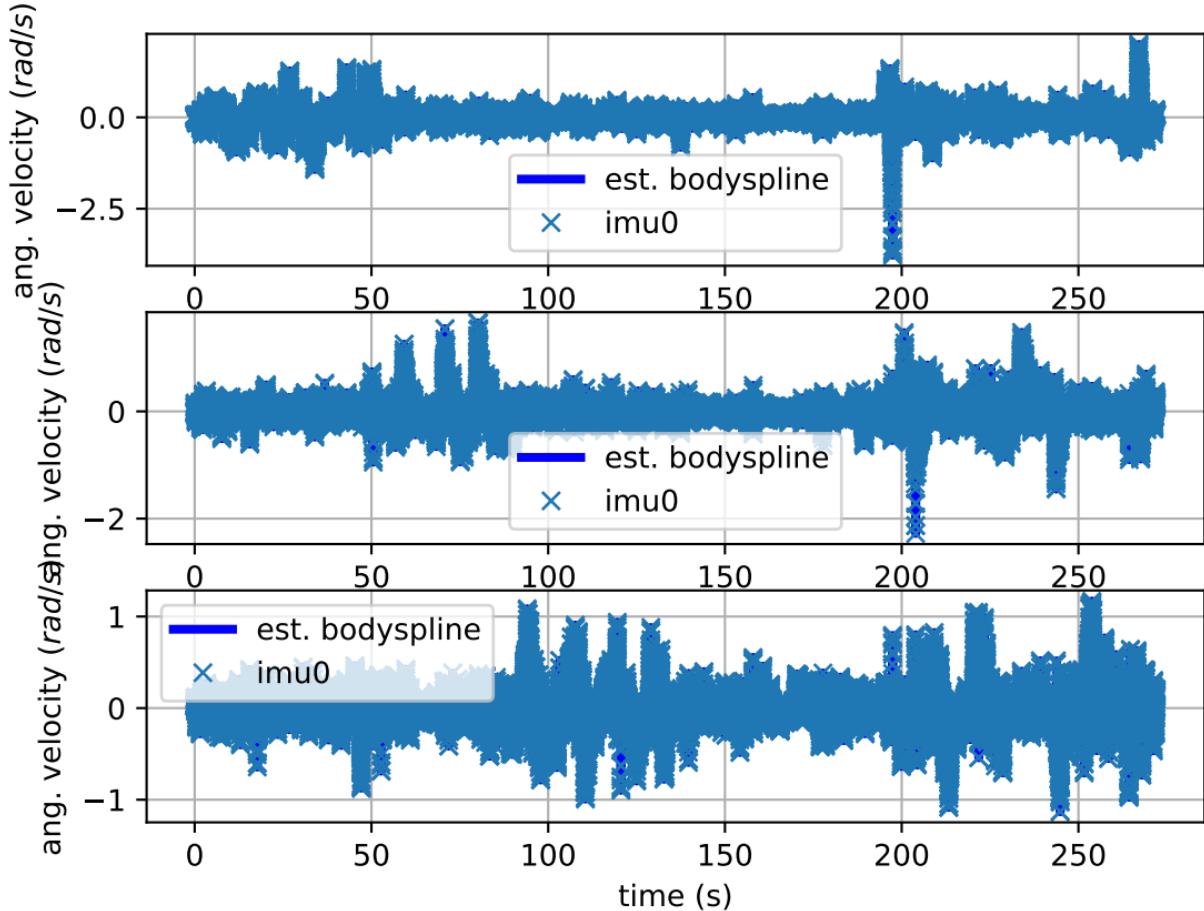
imu0: acceleration error



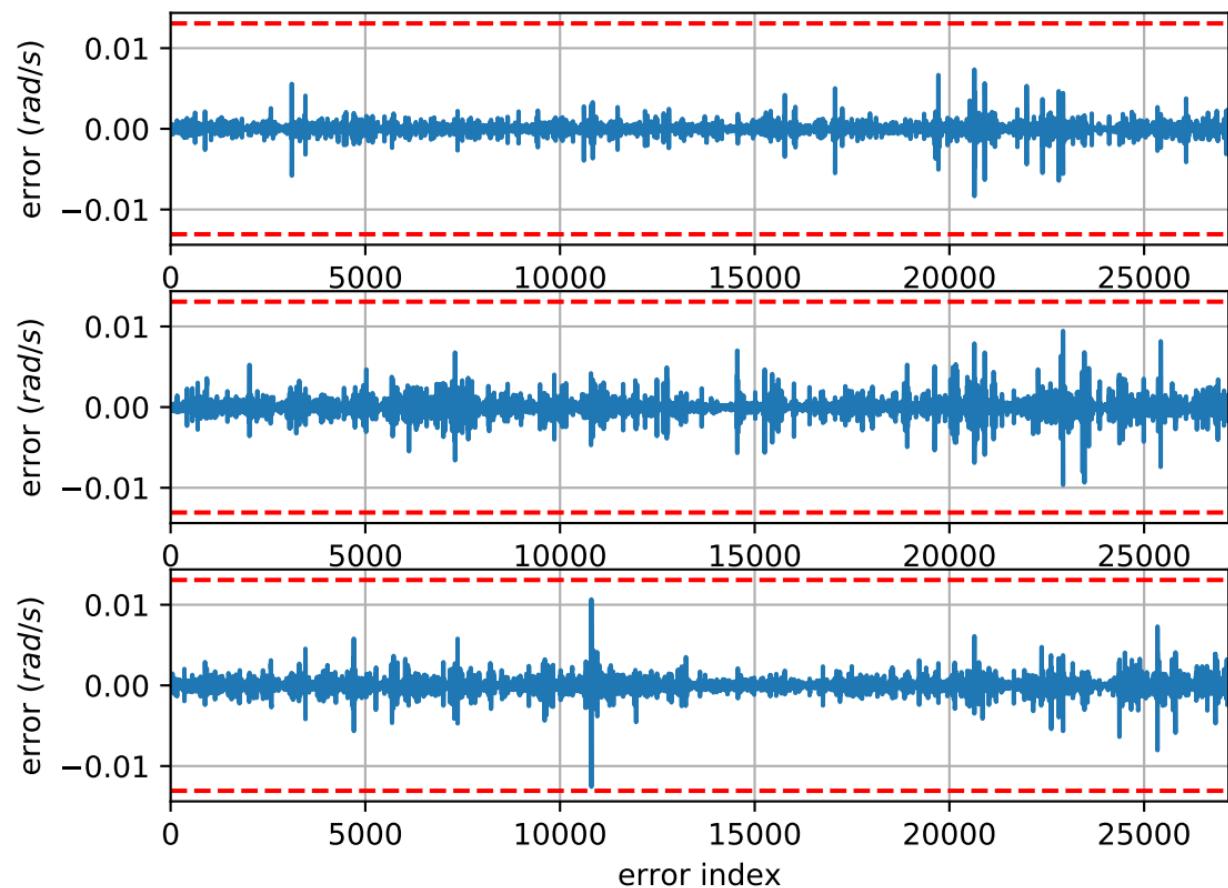
imu0: estimated accelerometer bias (imu frame)



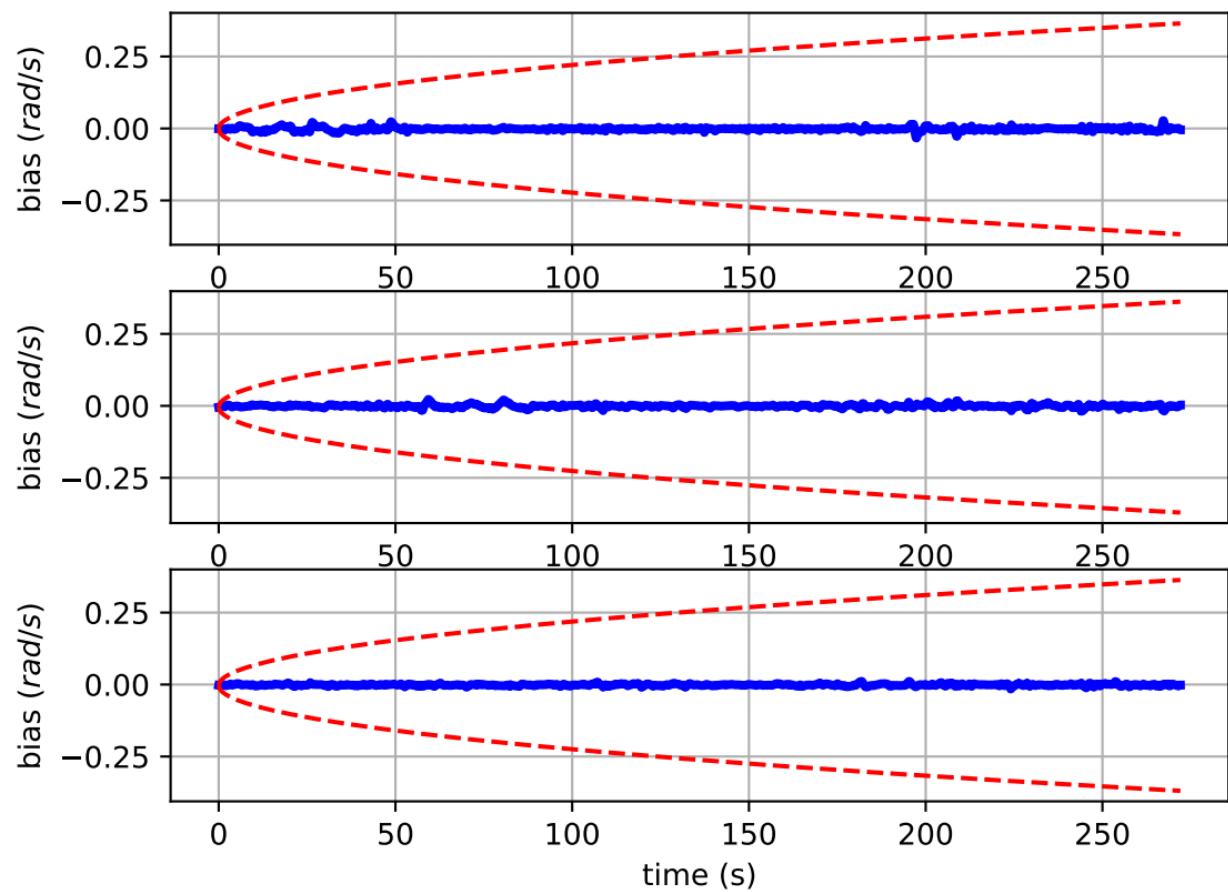
Comparison of predicted and measured angular velocities (body frame)



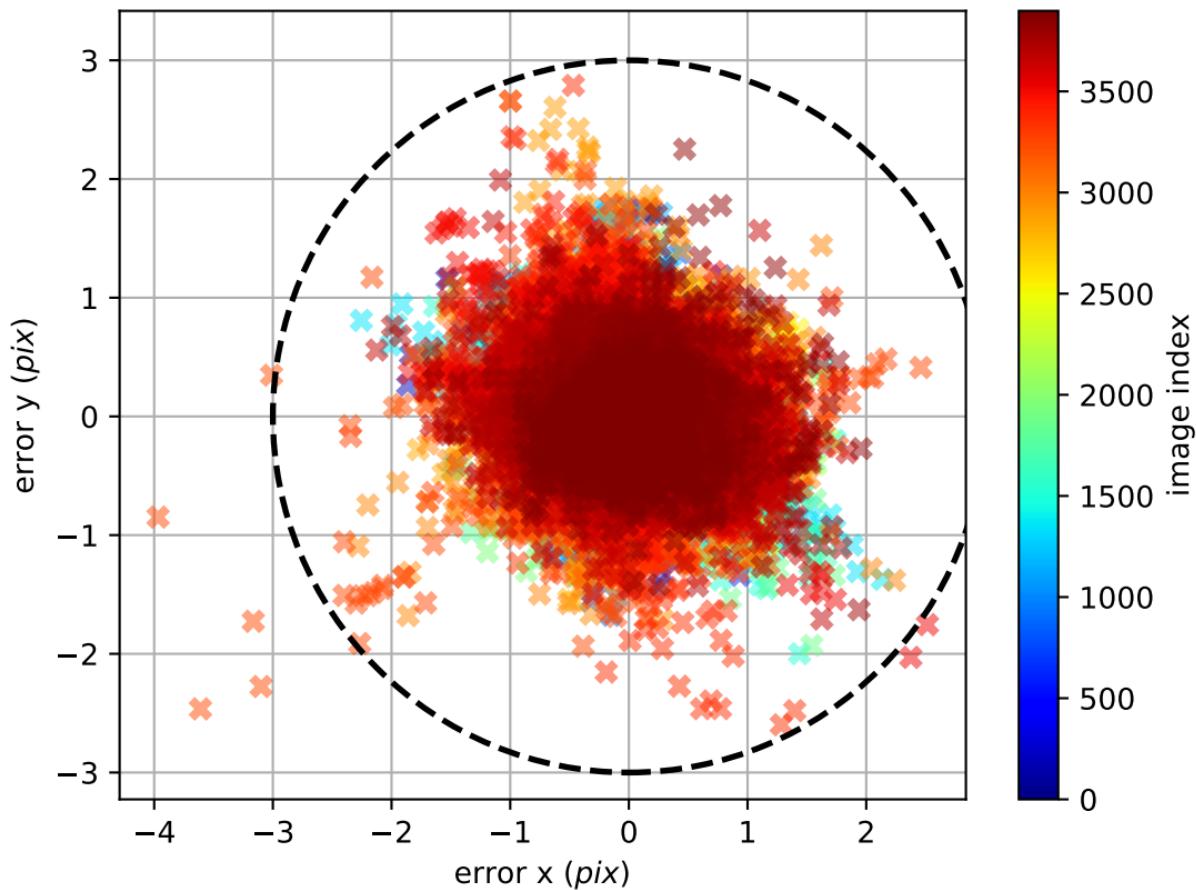
imu0: angular velocities error



imu0: estimated gyro bias (imu frame)



cam0: reprojection errors



cam1: reprojection errors

