

Calibration results

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Normalized Residuals

Reprojection error (cam0): mean 0.8544828759892689, median 0.6633534041875012, std: 0.7036065980090782
Reprojection error (cam1): mean 0.8490875823728565, median 0.6561662466351756, std: 0.7090219395148626
Gyroscope error (imu0): mean 0.7619373193908975, median 0.6216307092696481, std: 0.5444151876208995
Accelerometer error (imu0): mean 0.4473951145767403, median 0.3824511723114378, std: 0.2938365434674615

Residuals

Reprojection error (cam0) [px]: mean 0.8544828759892689, median 0.6633534041875012, std: 0.7036065980090782
Reprojection error (cam1) [px]: mean 0.8490875823728565, median 0.6561662466351756, std: 0.7090219395148626
Gyroscope error (imu0) [rad/s]: mean 0.01917667252089637, median 0.01564539265529903, std: 0.013702008685903808
Accelerometer error (imu0) [m/s²]: mean 0.06223046585741765, median 0.05319708205390769, std: 0.04087122185769199

Transformation (cam0):

T_ci: (imu0 to cam0):

```
[[ 0.00011071 -0.99999674 0.00255003 0.01786783]
 [ 0.00412642 -0.00254955 -0.99998824 -0.00617182]
 [ 0.99999148 0.00012123 0.00412613 -0.09019037]
 [ 0. 0. 0. 1. ]]
```

T_ic: (cam0 to imu0):

```
[[ 0.00011071 0.00412642 0.99999148 0.09021309]
 [-0.99999674 -0.00254955 0.00012123 0.01786297]
 [ 0.00255003 -0.99998824 0.00412613 -0.00584518]
 [ 0. 0. 0. 1. ]]
```

timeshift cam0 to imu0: [s] (t_imu = t_cam + shift)
1.4542223879060983

Transformation (cam1):

T_ci: (imu0 to cam1):
[[0.01055171 -0.99993987 0.00298508 -0.10216783]
 [0.00613148 -0.00292049 -0.99997694 -0.00633953]
 [0.99992553 0.01056977 0.00610029 -0.08947218]
 [0. 0. 0. 1.]]

T_ic: (cam1 to imu0):
[[0.01055171 0.00613148 0.99992553 0.09058243]
 [-0.99993987 -0.00292049 0.01056977 -0.1012345]
 [0.00298508 -0.99997694 0.00610029 -0.00548859]
 [0. 0. 0. 1.]]

timeshift cam1 to imu0: [s] (t_imu = t_cam + shift)
1.4547103968374868

Baselines:

Baseline (cam0 to cam1):
[[0.9999454 -0.0003921 0.01044272 -0.11909527]
 [0.00037118 0.99999792 0.00200504 0.00000649]
 [-0.01044348 -0.00200105 0.99994346 0.00088734]
 [0. 0. 0. 1.]]
baseline norm: 0.11909857858212694 [m]

Gravity vector in target coords: [m/s^2]
[-9.78612812 0.01264229 -0.63242356]

Calibration configuration

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cam0

Camera model: pinhole
Focal length: [528.4027999653242, 531.3497171840712]
Principal point: [474.87032932084225, 277.1237246990614]
Distortion model: radtan
Distortion coefficients: [-0.07049657711225177, 0.051482881365877135, 0.0016232322517828583,
0.003764952168746102]
Type: aprilgrid
Tags:
Rows: 6
Cols: 6
Size: 0.088 [m]
Spacing 0.026399999999999996 [m]

cam1

Camera model: pinhole
Focal length: [528.4351596431349, 531.1161758011998]
Principal point: [476.003008730348, 280.8669569745334]
Distortion model: radtan
Distortion coefficients: [-0.06573105081333722, 0.04419539470091933, 0.0013392201425812737,
0.0009710817519471766]
Type: aprilgrid
Tags:
Rows: 6
Cols: 6
Size: 0.088 [m]
Spacing 0.026399999999999996 [m]

IMU configuration

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IMU0:

Model: scale-misalignment
Update rate: 360.0

Accelerometer:

Noise density: 0.00733095518

Noise density (discrete): 0.13909509476045798

Random walk: 0.002402852263070995

Gyroscope:

Noise density: 0.00132648626

Noise density (discrete): 0.025168307199109827

Random walk: 1.5641515495643765e-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]

Gyroscope:

M:

[[0.99584937 0. 0.]

[0.01430098 1.03815183 0.]

[0.00555445 0.00977631 1.03972042]]

A [(rad/s)/(m/s²):

[[0.00036127 -0.00012024 -0.00008837]

[0.00020118 -0.00015632 0.0003567]

[-0.00066168 -0.00170397 -0.00158334]]

C_gyro_i:

[[0.999965 0.00613844 0.00568414]

[-0.00611192 0.99997041 -0.00467169]

[-0.00571265 0.00463678 0.99997293]]

Accelerometer:

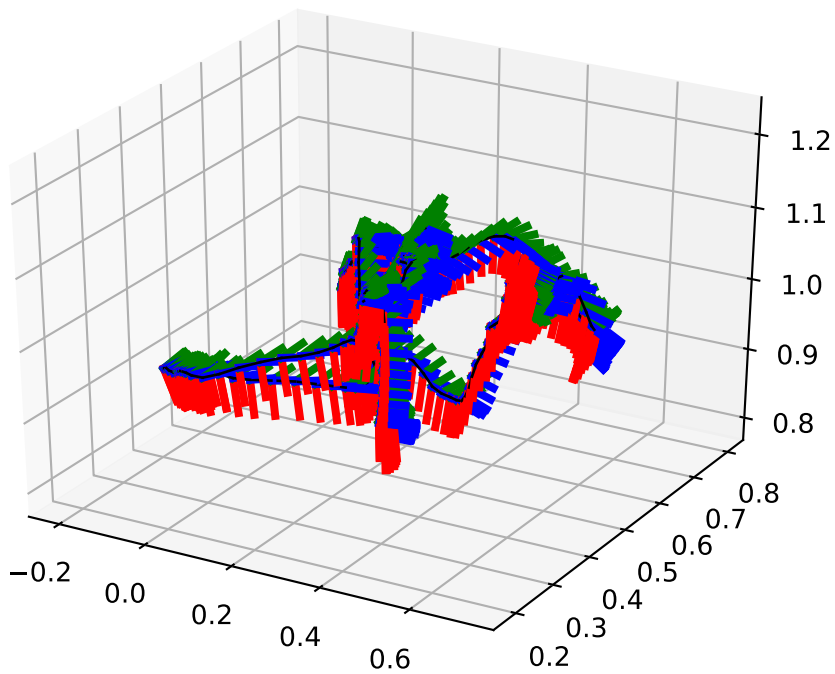
M:

[[1.01557755 0. 0.]

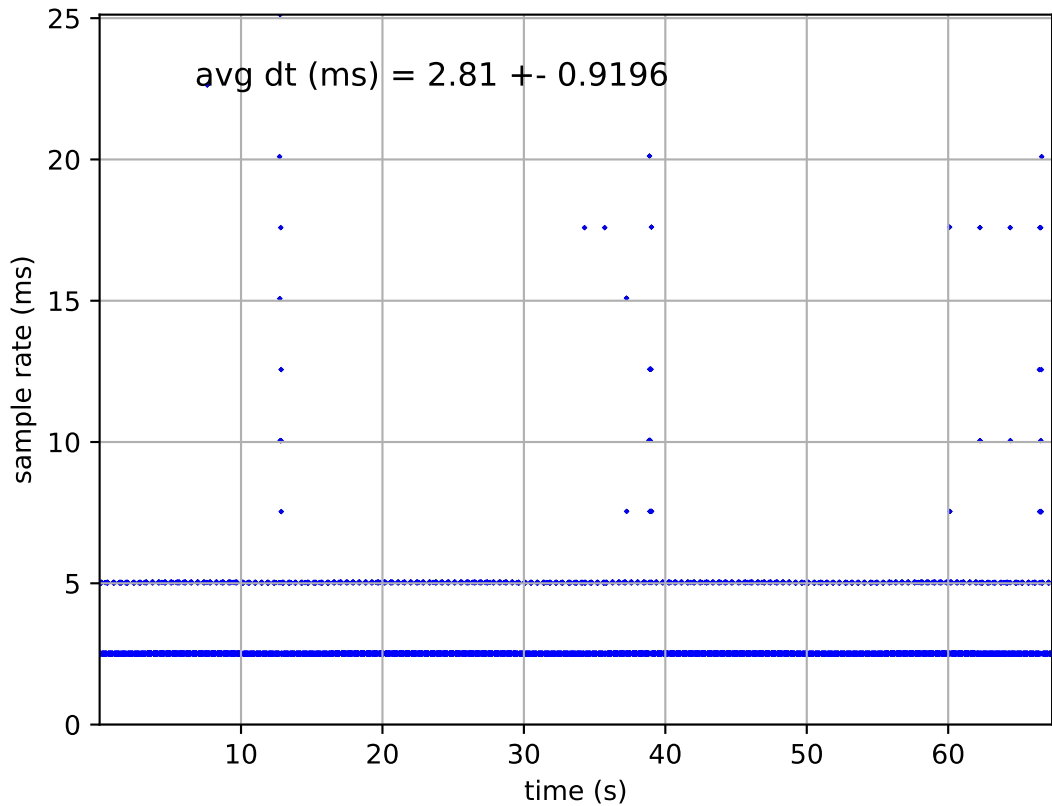
[-0.00655776 0.99193397 0.]

[-0.01382009 0.00084079 1.01433067]]

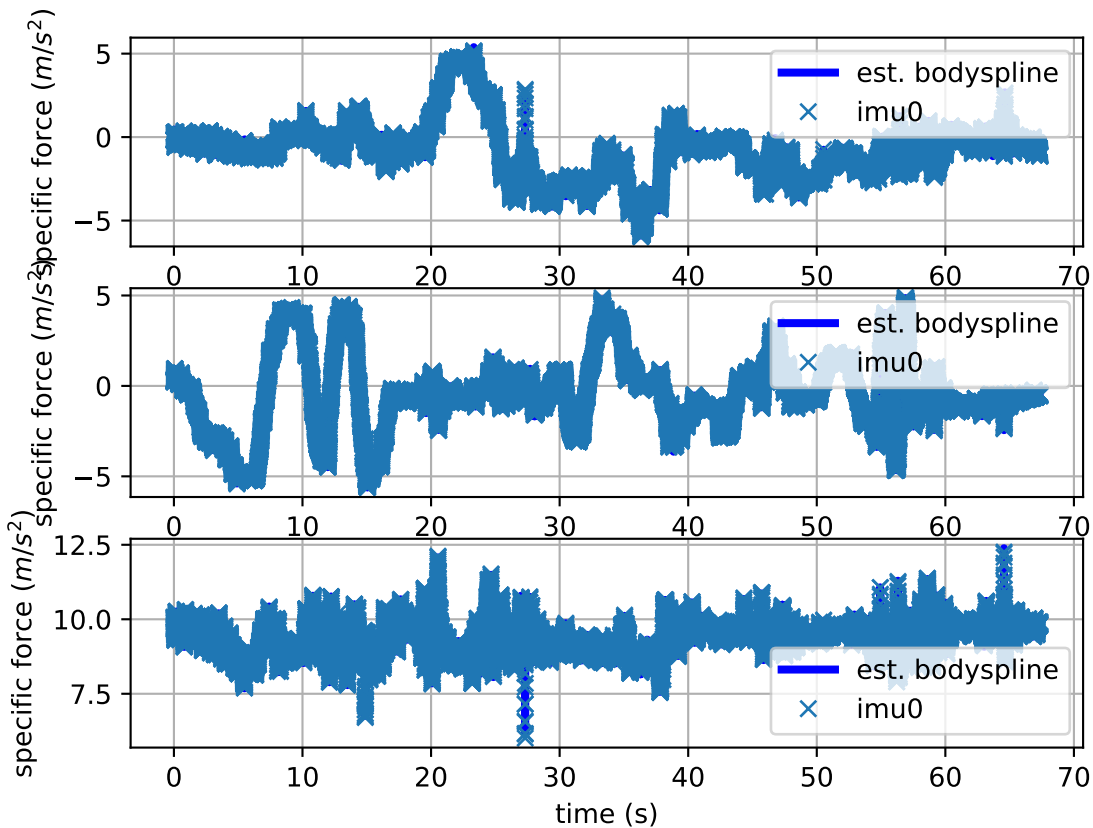
imu0: estimated poses



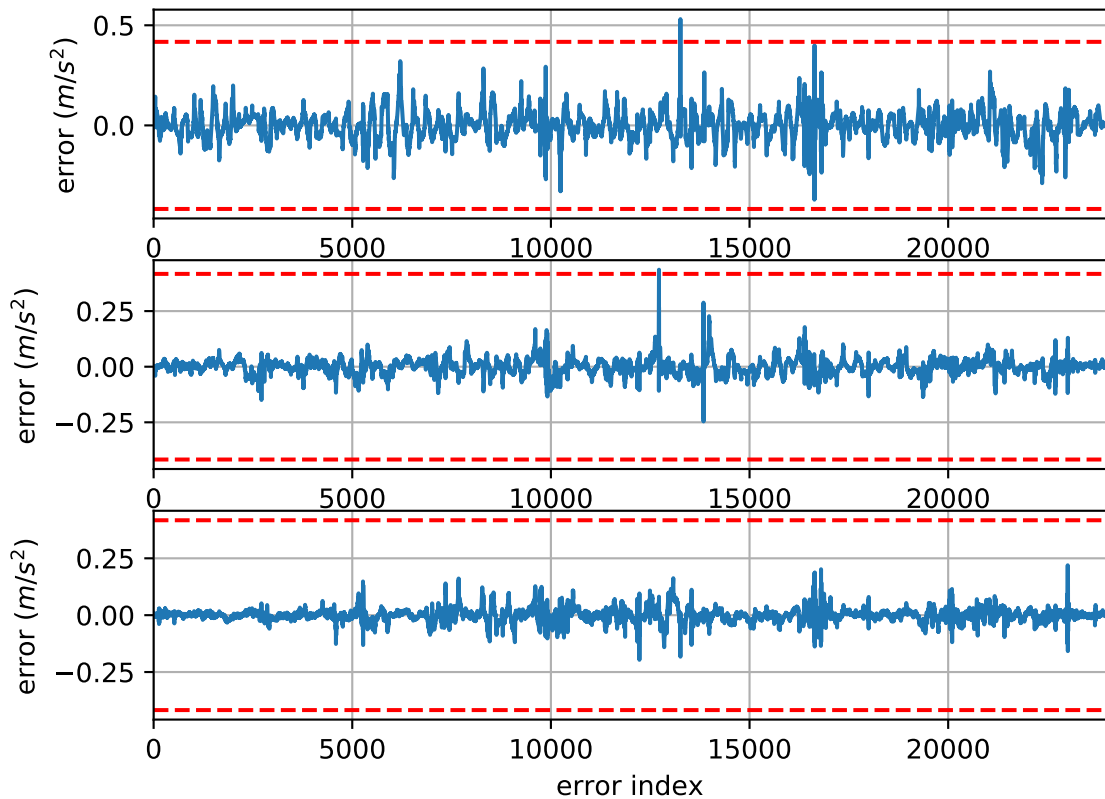
imu0: sample inertial rate



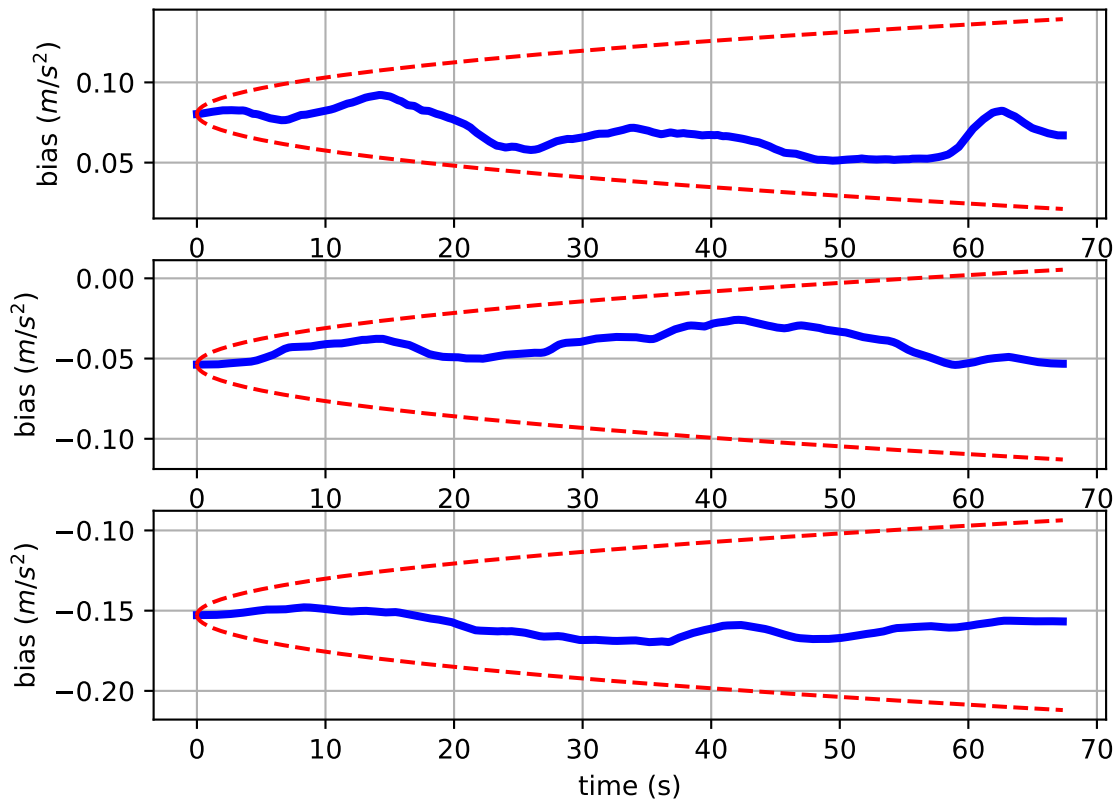
Comparison of predicted and measured specific force (imu0 frame)



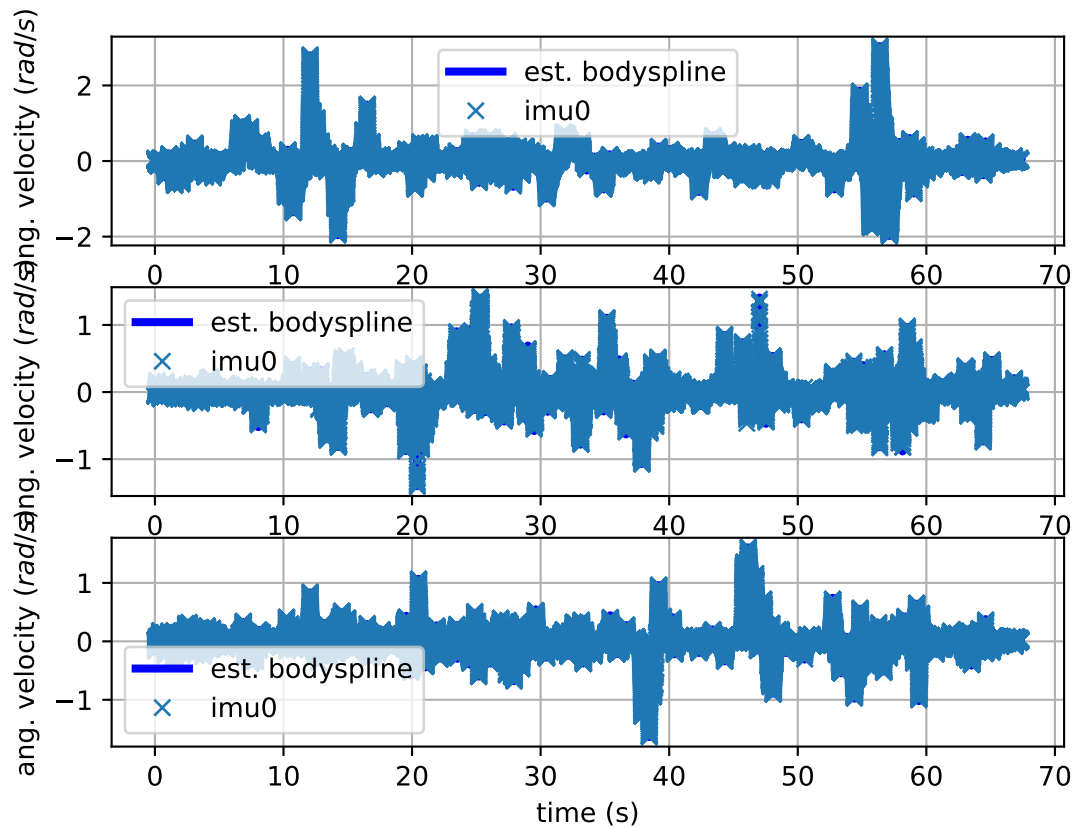
imu0: acceleration error



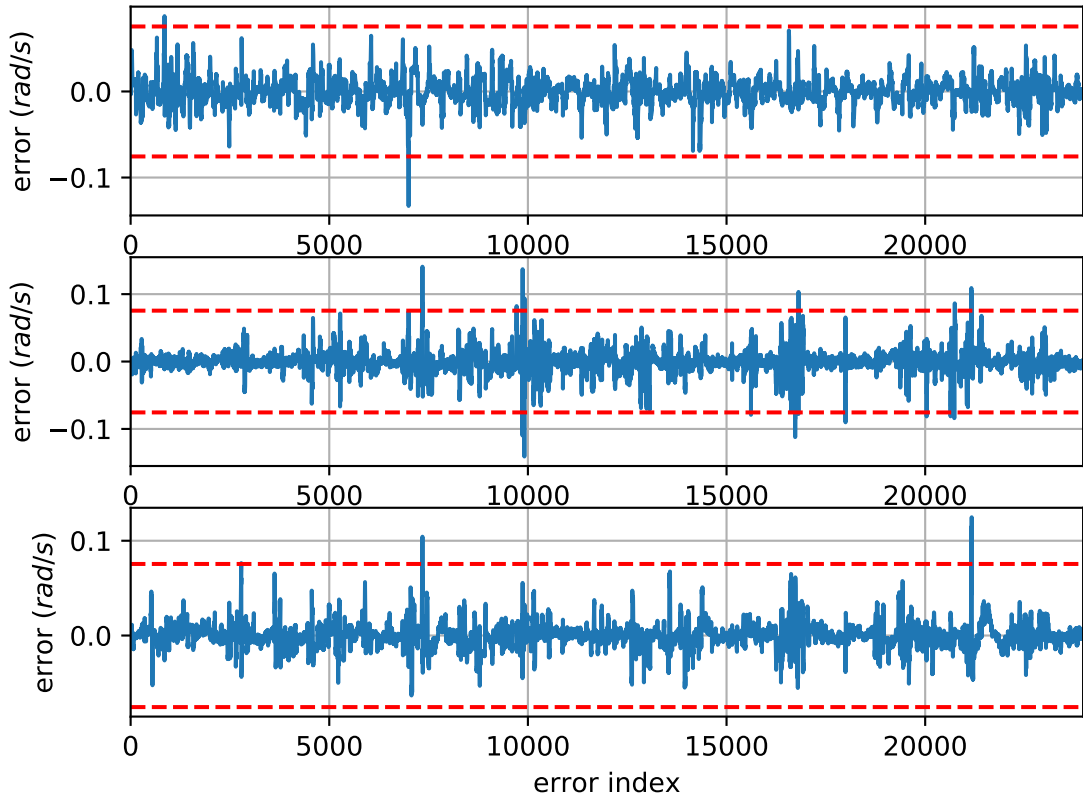
imu0: estimated accelerometer bias (imu frame)



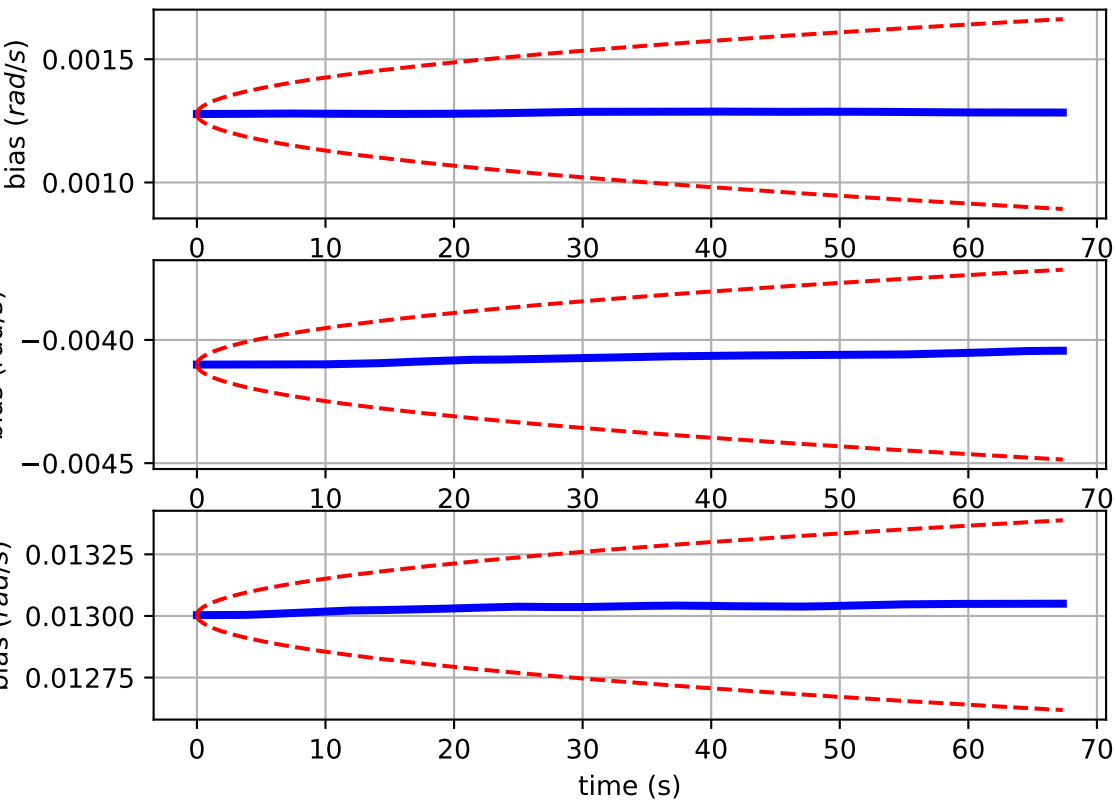
Comparison of predicted and measured angular velocities (body frame)



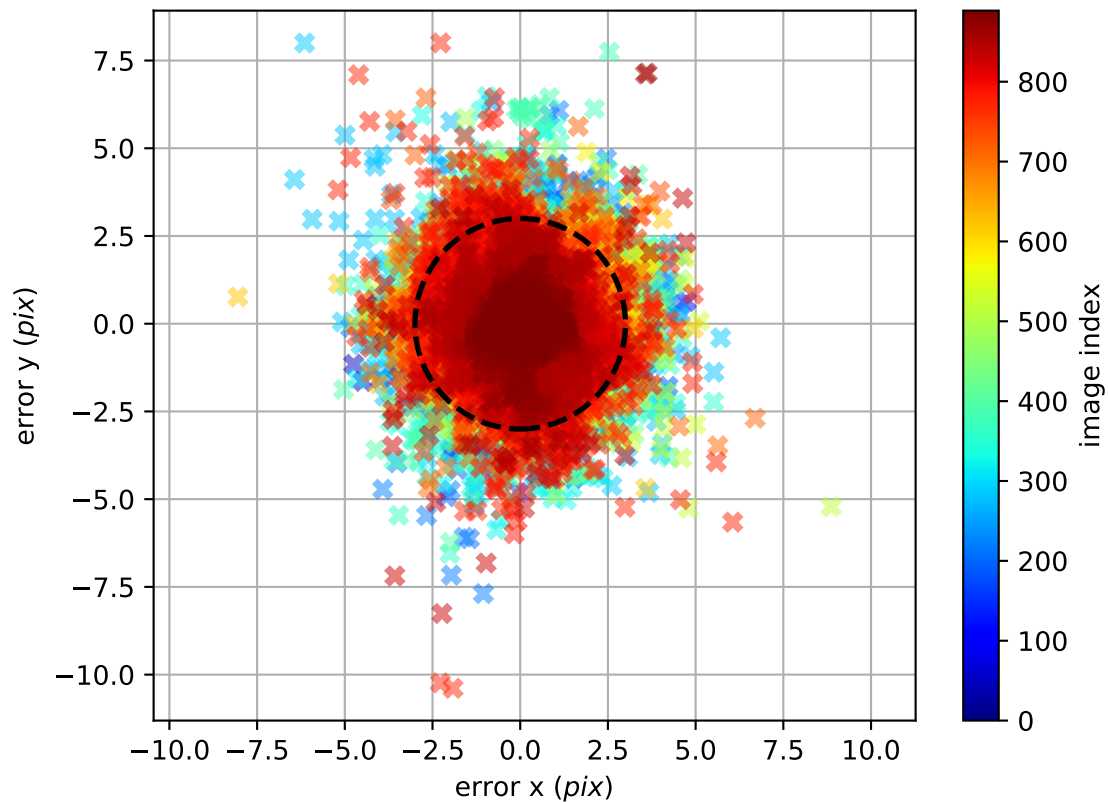
imu0: angular velocities error



imu0: estimated gyro bias (imu frame)



cam0: reprojection errors



cam1: reprojection errors

