

Calibration results

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Normalized Residuals

Reprojection error (cam0): mean 0.5865583187229658, median 0.41922942466820967, std: 0.5159415862993956
Gyroscope error (imu0): mean 1.6172681782235778, median 0.9804724300905142, std: 1.9821697878922615
Accelerometer error (imu0): mean 1.2535775733327295, median 0.8561015854493987, std: 1.458624919593991

Residuals

Reprojection error (cam0) [px]: mean 0.5865583187229658, median 0.41922942466820967, std: 0.5159415862993956
Gyroscope error (imu0) [rad/s]: mean 0.01157787819356806, median 0.0070191144057558585, std: 0.01419017617003692
Accelerometer error (imu0) [m/s²]: mean 0.08974249691957106, median 0.06128754656225841, std: 0.10442165298591312

Transformation (cam0):

T_ci: (imu0 to cam0):

[[-0.92891137 0.01869923 -0.36982969 -0.03846055]
[-0.02262466 -0.99972431 0.00627919 -0.00469053]
[-0.36961031 0.01420008 0.92907835 -0.02796707]
[0. 0. 0. 1.]]

T_ic: (cam0 to imu0):

[[-0.92891137 -0.02262466 -0.36961031 -0.04616948]
[0.01869923 -0.99972431 0.01420008 -0.00357292]
[-0.36982969 0.00627919 0.92907835 0.0117892]
[0. 0. 0. 1.]]

timeshift cam0 to imu0: [s] ($t_{imu} = t_{cam} + \text{shift}$)
-0.003270711063490899

Gravity vector in target coords: [m/s²]

[0.10508377 -9.75778829 -0.97105506]

Calibration configuration

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cam0

Camera model: pinhole

Focal length: [562.4835897839102, 562.2758027650797]

Principal point: [641.8907203697211, 432.82602102944185]

Distortion model: equidistant

Distortion coefficients: [-0.007844893505884944, 0.008805535665783643, 0.0005476253539323238, -0.0014426222209424652]

Type: aprilgrid

Tags:

Rows: 6

Cols: 6

Size: 0.0922 [m]

Spacing 0.02766 [m]

IMU configuration

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IMU0:

Model: scale-misalignment

Update rate: 205.0

Accelerometer:

Noise density: 0.005

Noise density (discrete): 0.07158910531638177

Random walk: 6e-05

Gyroscope:

Noise density: 0.0005

Noise density (discrete): 0.007158910531638177

Random walk: 5e-06

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:

[[0.98206758 0. 0.]

[0.00281213 1.01275618 0.]

[-0.00279575 -0.00393503 1.00631505]]

A [(rad/s)/(m/s²)]:

[[0.00024751 0.00001268 -0.00009317]

[-0.00001775 0.00030693 -0.00035772]

[-0.00010035 0.00068112 -0.00034407]]

C_gyro_i:

[[0.99999001 -0.00184649 -0.0040703]

[0.00182546 0.99998499 -0.00516554]

[0.00407978 0.00515806 0.99997837]]

Accelerometer:

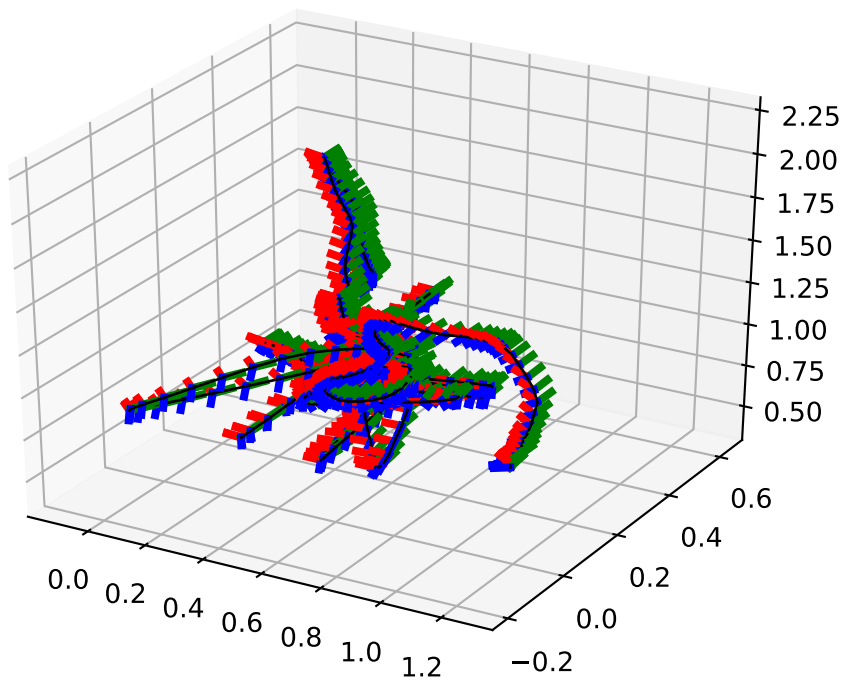
M:

[[1.00067043 0. 0.]

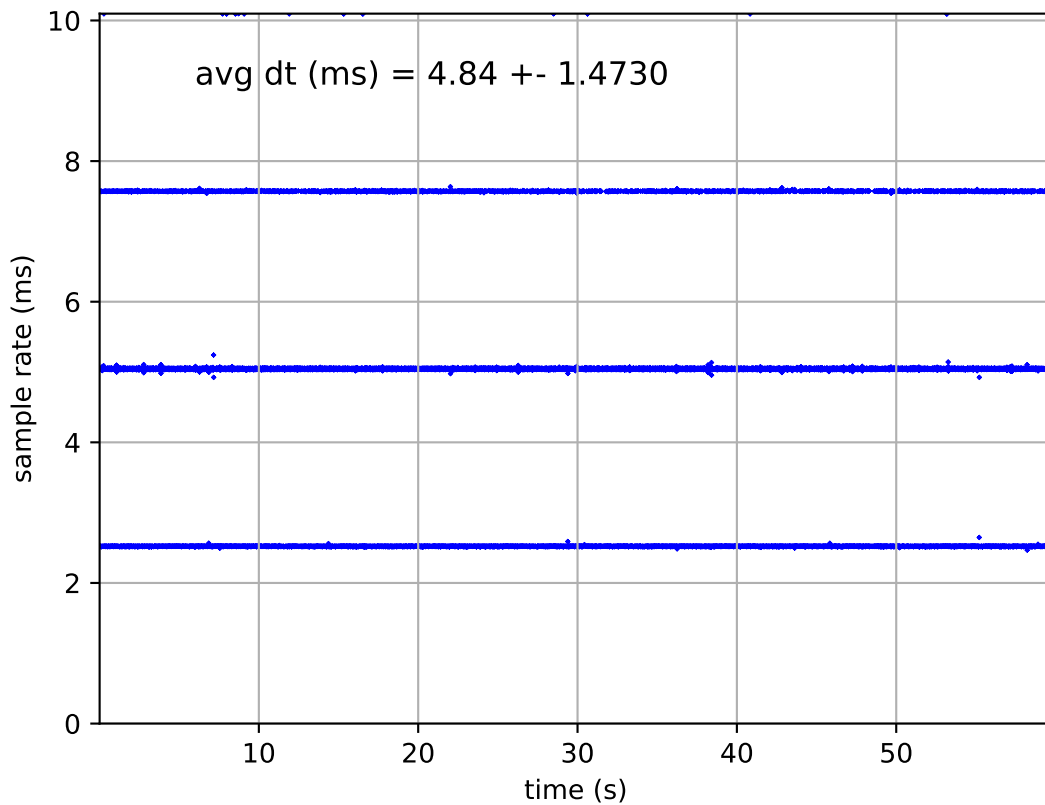
[0.00054476 1.00158202 0.]

[-0.00090511 -0.00433644 0.99627595]]

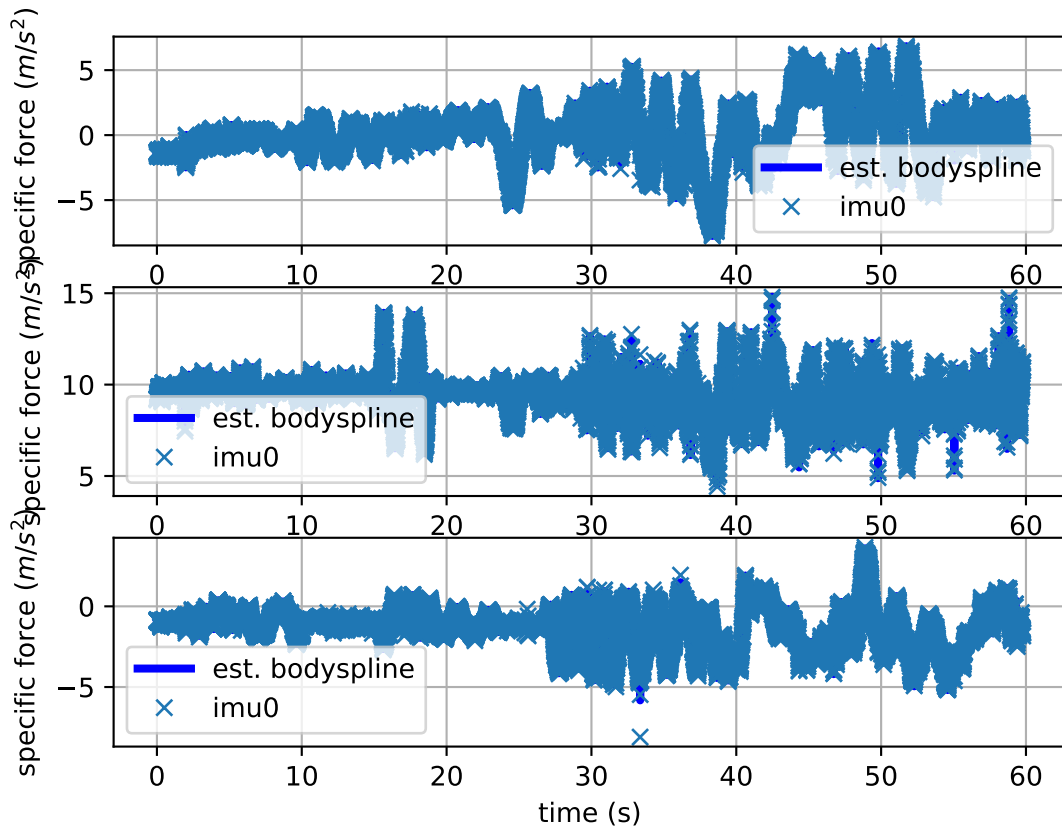
imu0: estimated poses



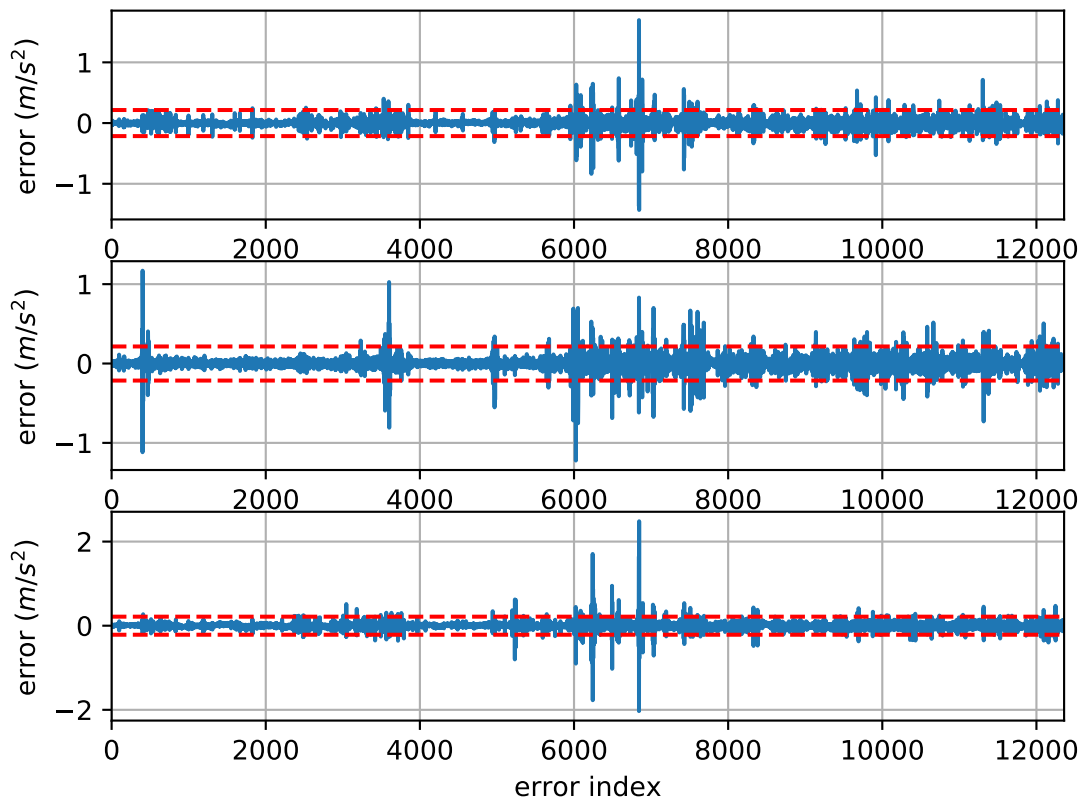
imu0: sample inertial rate



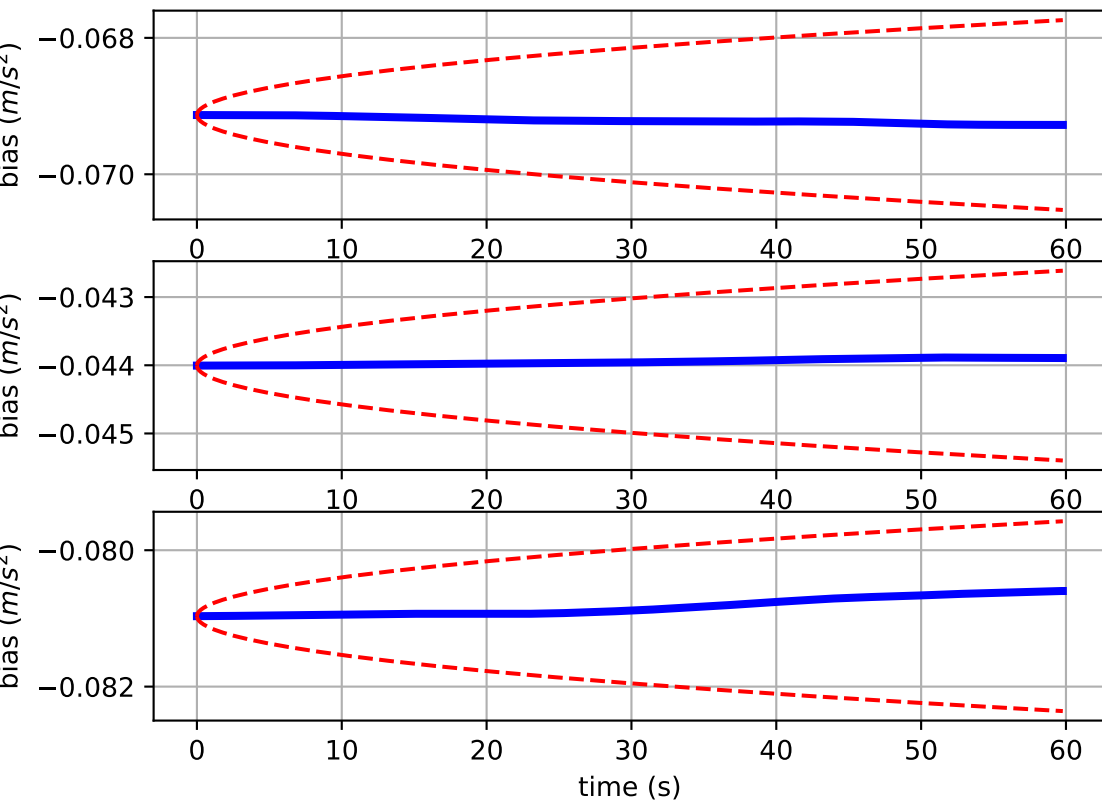
Comparison of predicted and measured specific force (imu0 frame)



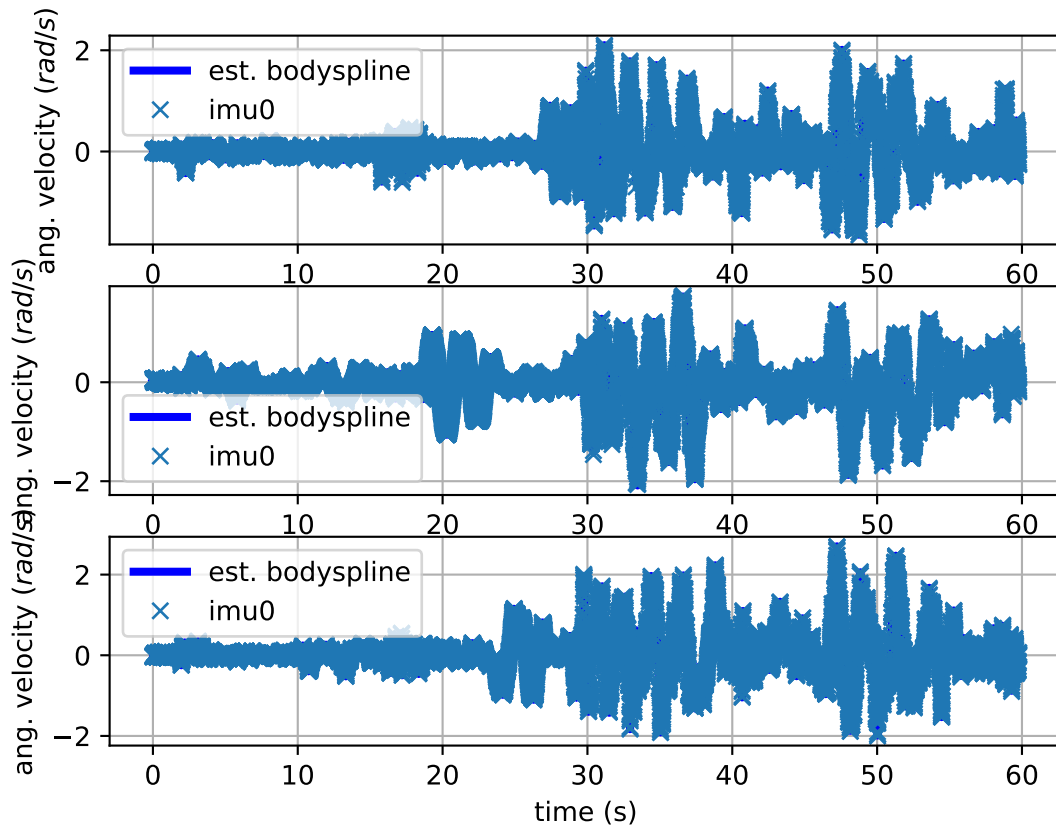
imu0: acceleration error



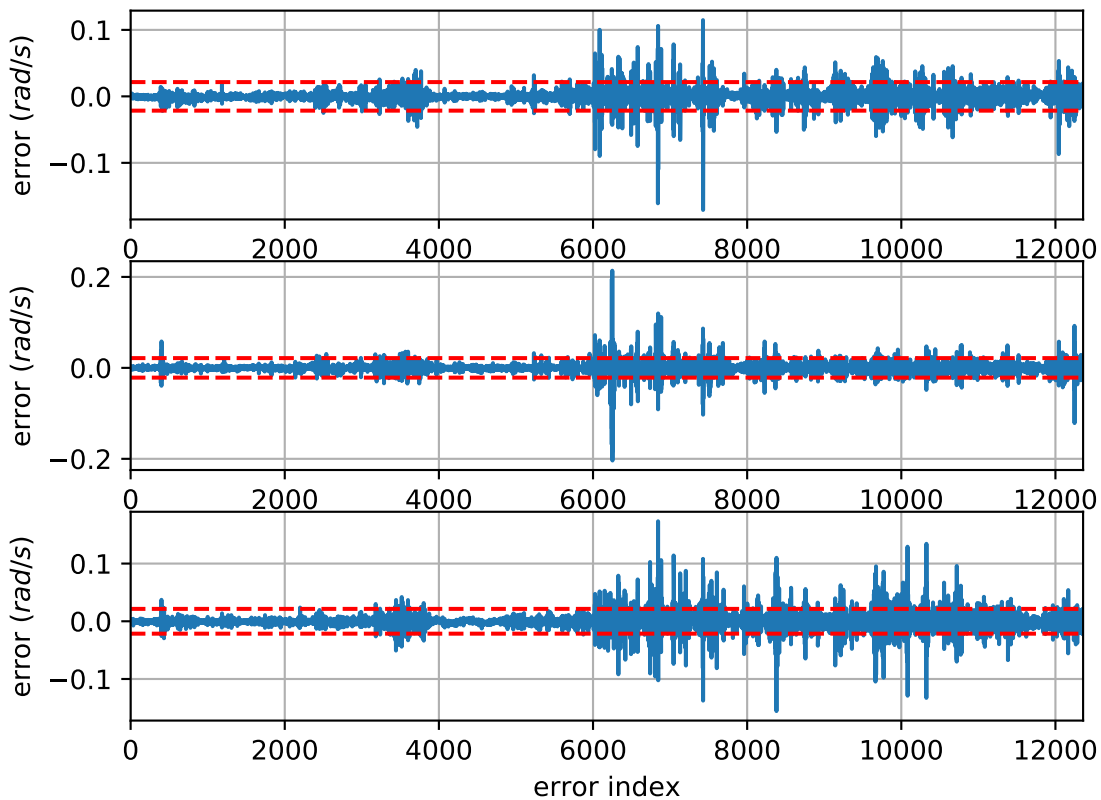
imu0: estimated accelerometer bias (imu frame)



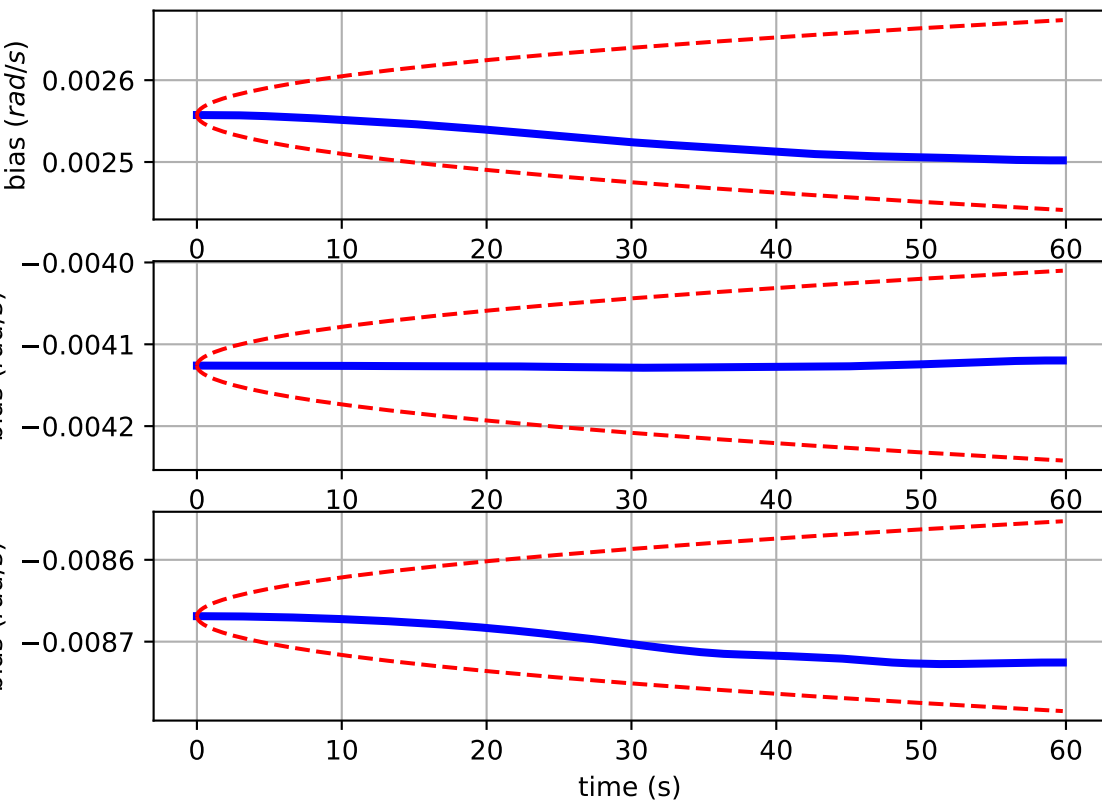
Comparison of predicted and measured angular velocities (body frame)



imu0: angular velocities error



imu0: estimated gyro bias (imu frame)



cam0: reprojection errors

