

Calibration results

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Normalized Residuals

Reprojection error (cam0): mean 0.1730805833435338, median 0.09474514973008459, std: 0.41067572

Gyroscope error (imu0): mean 8.108764579466577e-09, median 7.649556496392629e-11, std: 3.32197

Accelerometer error (imu0): mean 2.1457247982153804e-08, median 1.1078827232731708e-10, std: 1.09

Residuals

Reprojection error (cam0) [px]: mean 0.1730805833435338, median 0.09474514973008459, std: 0.41067

Gyroscope error (imu0) [rad/s]: mean 3.3276349519157516e-12, median 3.13918739588378e-14, std: 1.3

Accelerometer error (imu0) [m/s^2]: mean 2.269986253368058e-10, median 1.1720415191480819e-12, std: 1.09

Transformation (cam0):

T_ci: (imu0 to cam0):

[[-0.02421237 -0.99954587 0.01793928 0.00001139]

[-0.46836486 -0.0045116 -0.88352363 0.0001549]

[0.88320333 -0.02979433 -0.46804292 -0.00001698]

[0. 0. 0. 1.]]

T_ic: (cam0 to imu0):

[[-0.02421237 -0.46836486 0.88320333 0.00008782]

[-0.99954587 -0.0045116 -0.02979433 0.00001158]

[0.01793928 -0.88352363 -0.46804292 0.00012871]

[0. 0. 0. 1.]]

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

0.0001142942048955061

Gravity vector in target coords: [m/s^2]

[9.80589066 -0.11363284 0.0043359]

Calibration configuration

Camera model: pinhole
Focal length: [463.17819, 466.37466]
Principal point: [334.07574, 232.802]
Distortion model: radtan
Distortion coefficients: [0.005641, 0.021369, -0.011285, -0.002365]
Type: checkerboard
Rows
 Count: 6
 Distance: 0.05 [m]
Cols
 Count: 11
 Distance: 0.05 [m]

IMU configuration

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IMU0:

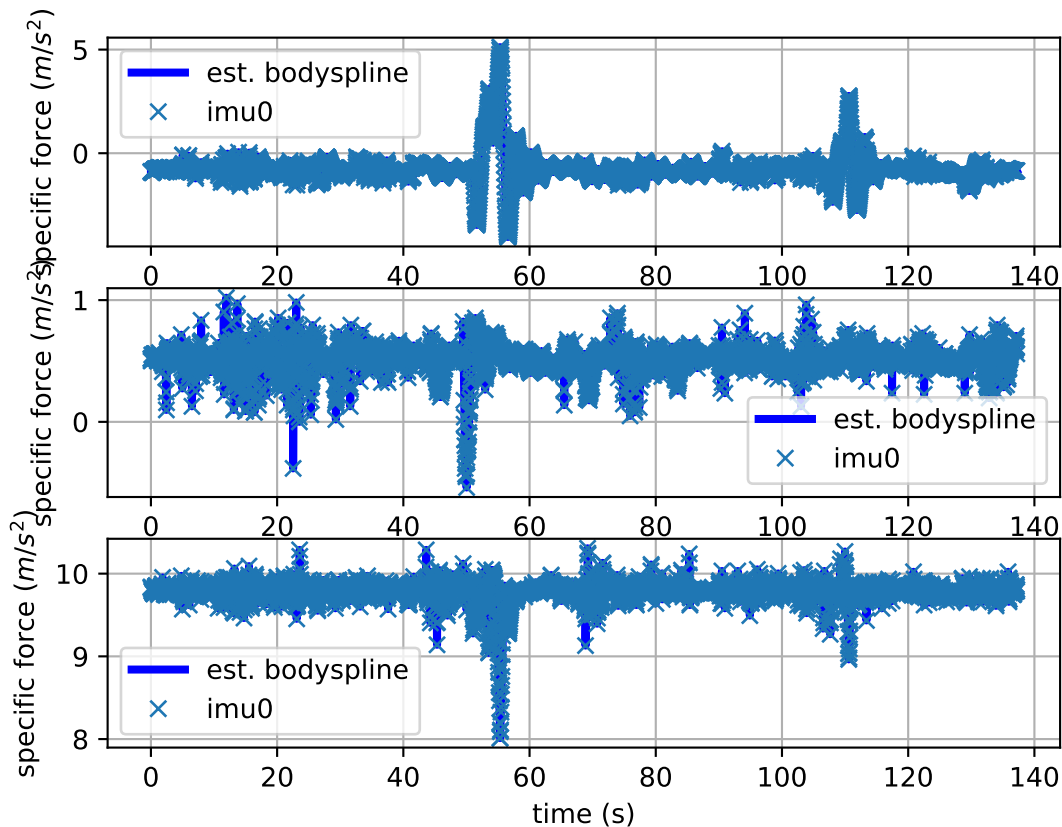
Model: calibrated
Update rate: 30.0
Accelerometer:
 Noise density: 0.0019314727238559915
 Noise density (discrete): 0.010579111800618731
 Random walk: 0.00024369423344425823
Gyroscope:
 Noise density: 7.492389699421491e-05
 Noise density (discrete): 0.0004103750847992502
 Random walk: 4.253266741725987e-06

T_i_b

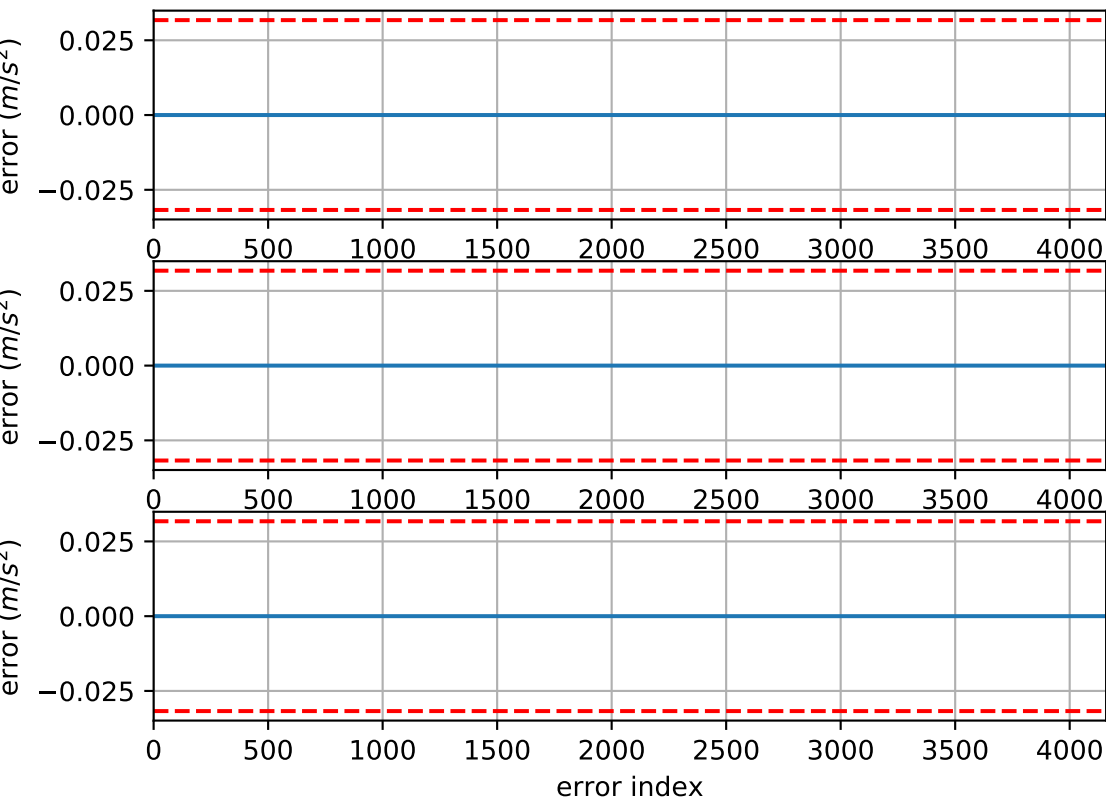
[[1. 0. 0. 0.]
 [0. 1. 0. 0.]
 [0. 0. 1. 0.]
 [0. 0. 0. 1.]]

time offset with respect to IMU0: 0.0 [s]

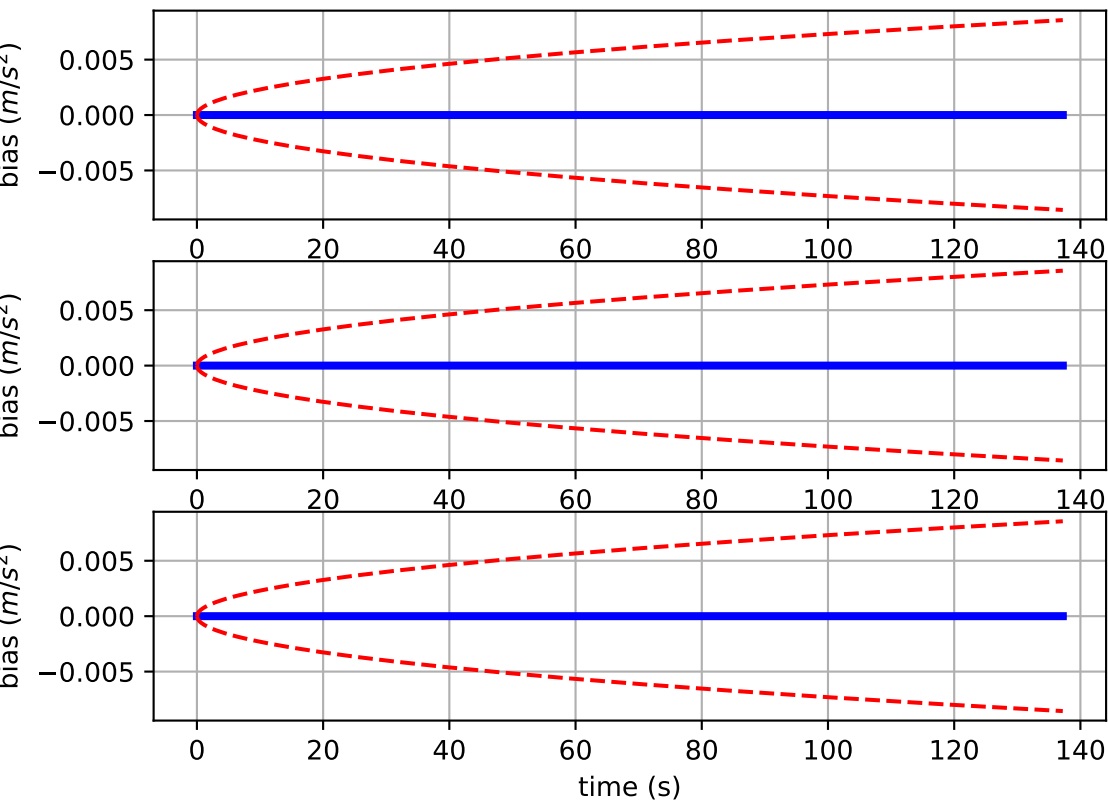
Comparison of predicted and measured specific force (imu0 frame)



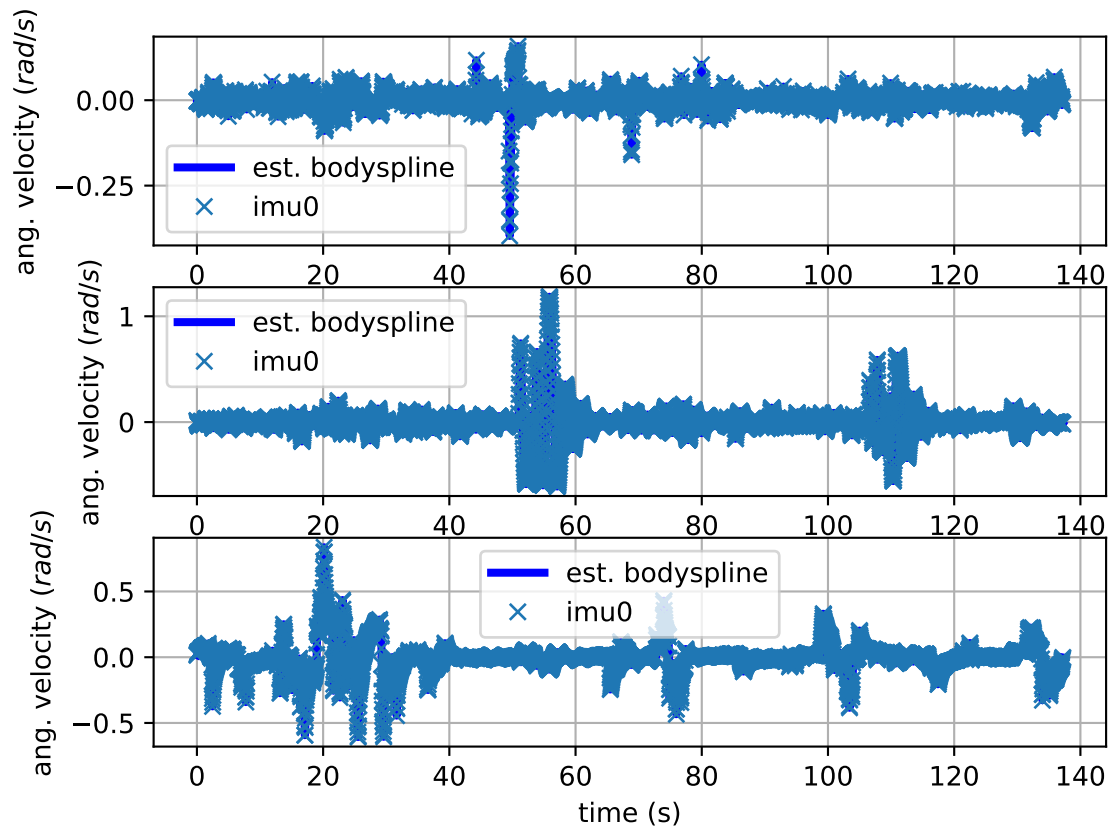
imu0: acceleration error



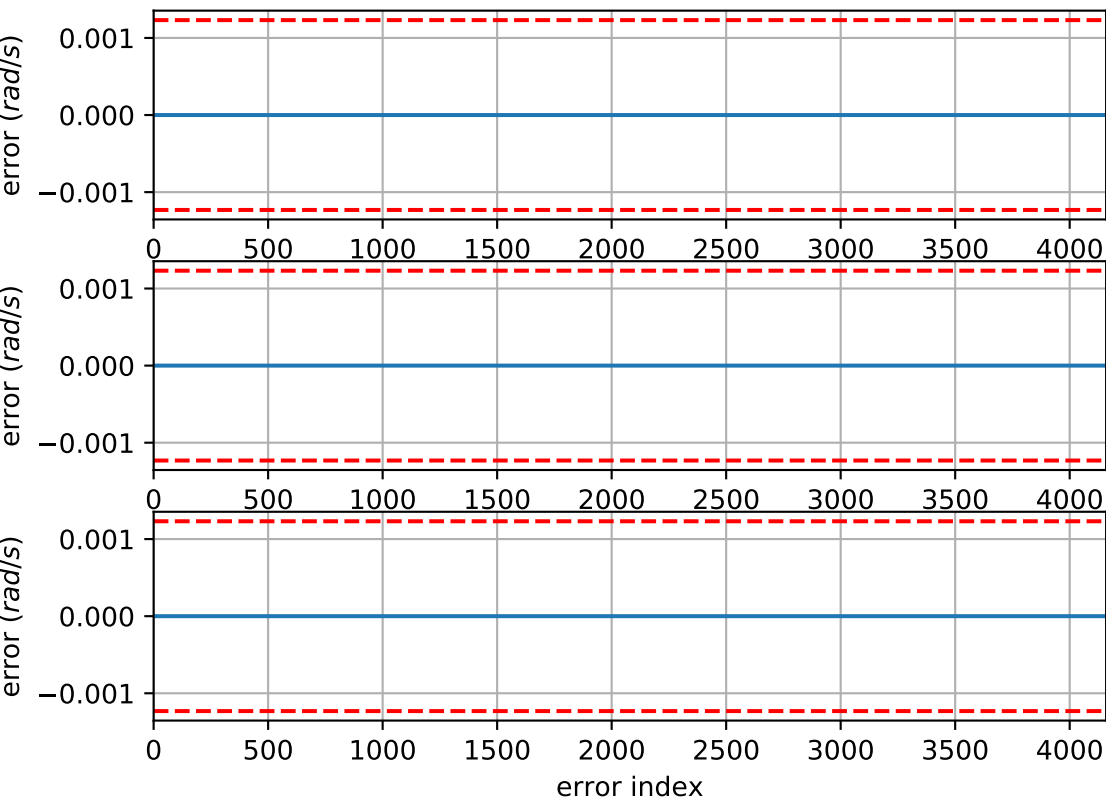
imu0: estimated accelerometer bias (imu frame)



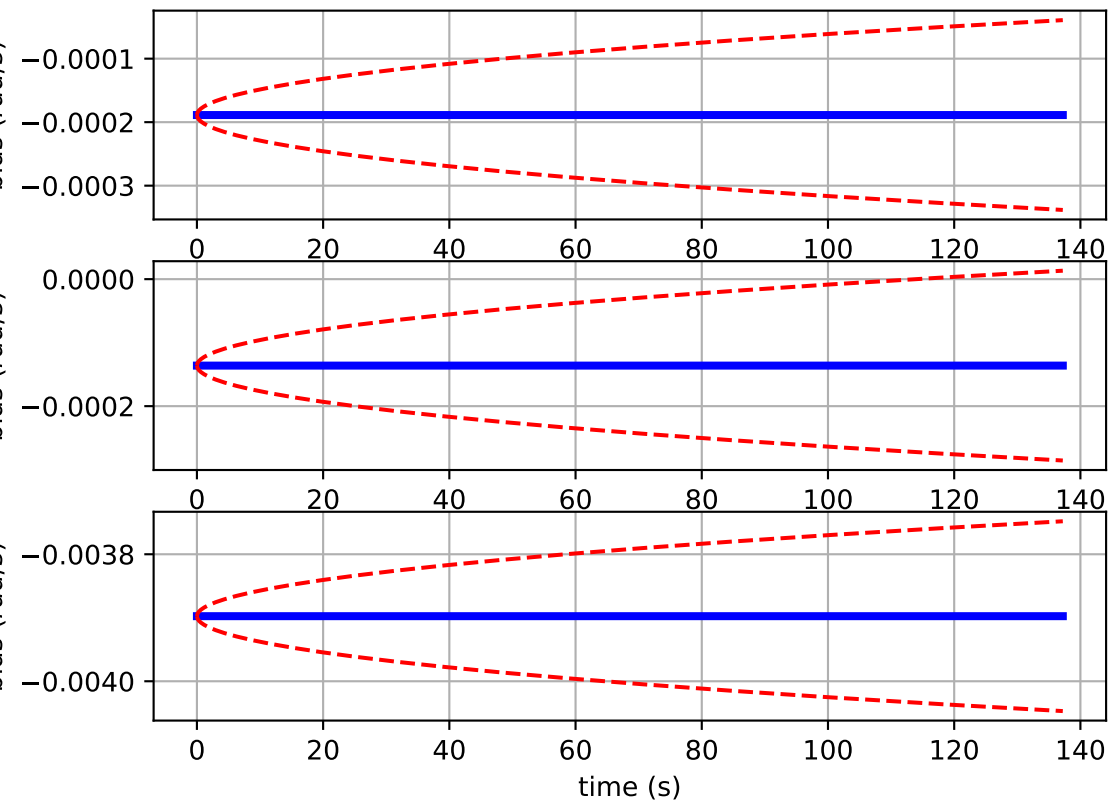
Comparison of predicted and measured angular velocities (body frame)



imu0: angular velocities error



imu0: estimated gyro bias (imu frame)



cam0: reprojection errors

