

Transfer Function Documentation

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1 Project Structure

All code regarding spinal keypoint estimation is located in the `TransferFunction` package found here. The `TransferFunction` package contains the following subpackages:

- `ST1_N`: Directory for the csv files containing IMU quaternion data
- `Optimization of constraints`: Folder for the initial optimization function for calibration without using spinal keypoint estimates.
- `QUAL_AVA_analysis`: Folder for the code used to compute and output IMU ROM (Range of Motion) estimates.
- `BlandAltman`: Folder for the code used to compute and output Bland-Altman plots for the IMU ROM estimates compared to manually collected ground truth.
- `RMSE MAE Rsquared table`: Folder for the code used to compute and output the RMSE, MAE, and R-squared values for the IMU ROM estimates compared to manually collected ground truth.

The project contains additional files that are currently not being used for the transfer function. These files were kept in the project for potential future use.

2 Usage

Place the csv files containing IMU quaternion data in the `ST1_N` directory. In the `QUAL_AVA_analysis` directory, run the `QUAL_AVA_analysis.m` file. This will output the IMU ROM estimates in the `Analysis Results` directory. The `BlandAltman` and `RMSE MAE Rsquared table` directories contain functions that can be run to compute and output the Bland-Altman plots and the RMSE, MAE, and R-squared values for single sensors, respectively. The `Optimization of constraints` directory contains the `Optimisation.allCONSTTYPE.m` function that can be run to plot the initial optimization constraints.