Keyframe-Based Visual-Inertial SLAM Using Nonlinear Optimization S. Leutenegger, P. Furgale, V. Rabaud, M. Chli, K. Konolige, and R. Siegwart (RSS 2013)



- A joint non-linear cost function to optimize an IMU error + landmark reprojection error in a fully probabilistic manner
- Non-linear optimization approaches vs. filtering schemes
- Tightly coupled vs. loosely coupled approaches for visual-inertial fusion
- Marginalization of old states to maintain a bounded-sized optimization window for real-time performance
- A fully probabilistic derivation of IMU error terms, including the respective information matrix
- Building a pose graph without expressing global pose uncertainty
- Both the hardware and the algorithms for accurate real-time SLAM, including robust keypoint matching and outlier rejection using inertial cues
- Evaluated using a stereo-camera/IMU setup