**Introduction**

This set of documents main outlines the theory and methods developed in three main projects:

H16S Servo Creel

Keyence XG Calibration

Projector Calibration/Registration

The documents are not intended to be for getting started with these systems, instead, they document the methodologies used to develop and verify the performance of the systems. As such they should be treated as techniques that allow the researcher to repeat the development process in an expedited manner. These documents provide a good starting point for the theory that has already not only been developed but also verified in practice via experiment.

The rough table of contents:

H16:

1. Cheatsheet for H16S and OH20S
2. Controller design
3. Controller tuning
4. Feed motor torque prediction
5. Diameter signal filtering
6. Relevant datasheets for H16S Implementation
7. Submitted Patent Application

Keyence XG Calibration

1. Estimation of Homography
2. SVD Rigid Transform Algorithm
3. Camera Calibration/Registration
4. Efficient Perspective n-Point Algorithm (EPnP)
5. Exact Implementation of Camera Calibration/EPnP

Projector Calibration/Registration

1. Kinematic Derivation
2. Optimization calibration techniques and results
3. Registration Solver
4. Calibration function solver
5. Verification
6. Readings
7. Numerical Methods
8. Hardware documentation
9. Correspondence

The documents are also available on keytech:

1. AFP Servo Creel Development
2. R&D Papers -> Owen

Good luck!

Owen