State Variables Estimation Using Vision Sensor Data Considering Uncertainty of Time Delay

Conditions
Duration: 6 months
Requirements:
- Knowledge of control theory
- Matlab programming
- English Language

Content
The technical progress in processors, digital electronics, and vision sensors (i.e. computer equipment's, cameras) caused an increased use of visual servoing in robotics applications. A vision sensor (camera) represents a contactless virtual movable measurement sensor, or a set of sensors working in the same time (i.e. getting a set of data from the camera). In a robotics context, the visual measurements are often needed to provide a feedback for control or state estimation. To attain controller stability, the sample rate needs to be high enough and the sensor delay low; otherwise vision sensor will give incorrect information.

This work is focused to the dynamical state estimation using vision sensor data when the time delay of the measurement is uncertain. In this work, the state variables estimation of elastic ship-mounted crane (ESMC) using two types of estimators has to be carried out. By using two different types of measurements for each estimator considering the problem of uncertain time delay in one of these measurements has to be discussed.

The tasks of this work can be summarized as follows:
1. Review the problem of state estimation using delayed measurements
2. Design of two state estimators for ESMC using delayed and non-delayed measurements
3. Realizing simulation
4. Complete and detailed documentation of the work
5. Presentation of the results

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