

# Autonomous & Intelligent Systems Laboratory Archive

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### I. Distributed Consensus-Based Kalman Filter under limited Communication

#### Summary:

In summary, we show that when quantized information is communicated in the Kalman consensus scheme, the resulting estimation error covariance matrices do not significantly change in comparison with the uncompressed version. We note that the particular characterization of the quantizer used can affect the state estimates obtained and the resulting estimation error covariances.

#### Questions:

- What is a covariance Matrix?
- What are Bayesian Filters?

#### Notes:

- Fully distributed Kalman filtering algorithm where each agent shares a compressed version (Quantized) of its estimated state info with its neighboring nodes.
- A key element in enabling distributed-decision making is distributed estimation.
- In this work we consider the computation of the estimation error covariances in a distributed manner. This work focuses on fully distributed Kalman filter operating in an environment with limited communication. We are assuming a limited bandwidth.
- Our focus for limited communication is on quantizing or compressing information being broadcast to a few bits for communication.

#### Conclusion:

The proposed algorithm has been tested using an uniform quantizer. The results are positive in the sense that the estimation error is kept under acceptable value.

### II. Stability of a Distributed Consensus-Based Kalman Filter under limited communication

#### Summary:

#### Questions:

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Notes:

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Conclusion:

### **III. An Optimal Kalman-Consensus Filter for Distributed Implementation over a dynamic communication network.**

Summary:

Questions:

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Notes:

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Conclusion: