Introduction to Robotics CSCI/ARTI 4530/6530

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Agenda

- A quick recap
- For today
  - Introduction to Markov Localization
  - Kalman Filter Localization

A quick recap

ROS Networking: working with multiple machines:

1. Export ROS_MASTER_URI = http://master-IP:11311
2. Export ROS_IP=local-IP

Problems with AF_INET/hostname resolution:

Solution - add the host name and its IP address in the /etc/hosts file of both the computers

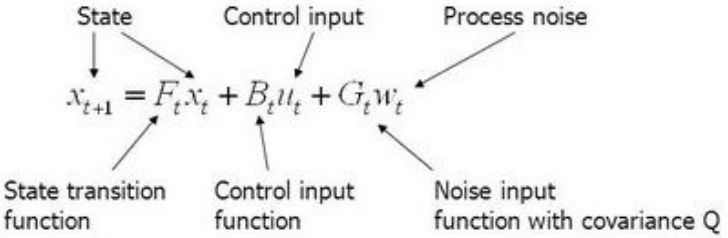
For today – Markov Localization

See the attached EdX slides

For today – Kalman Filter Basics

Kalman Filter Model

Linear discrete time dynamic system (motion model)



Measurement equation (sensor model)

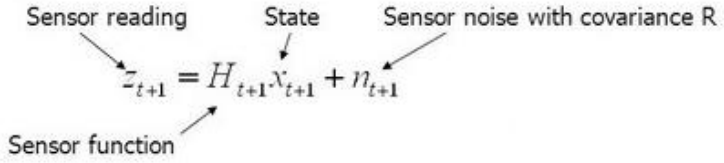


Image courtesy: Dr. Paul E. Rybski

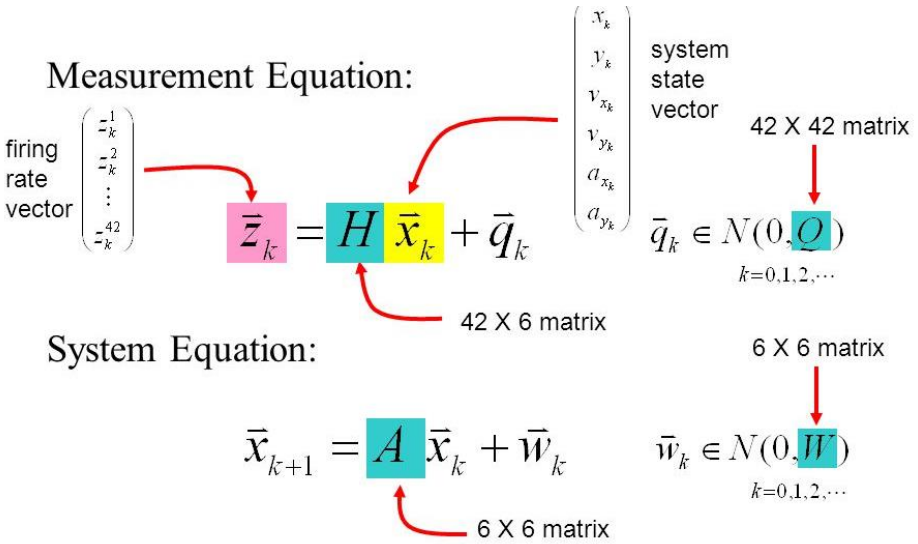
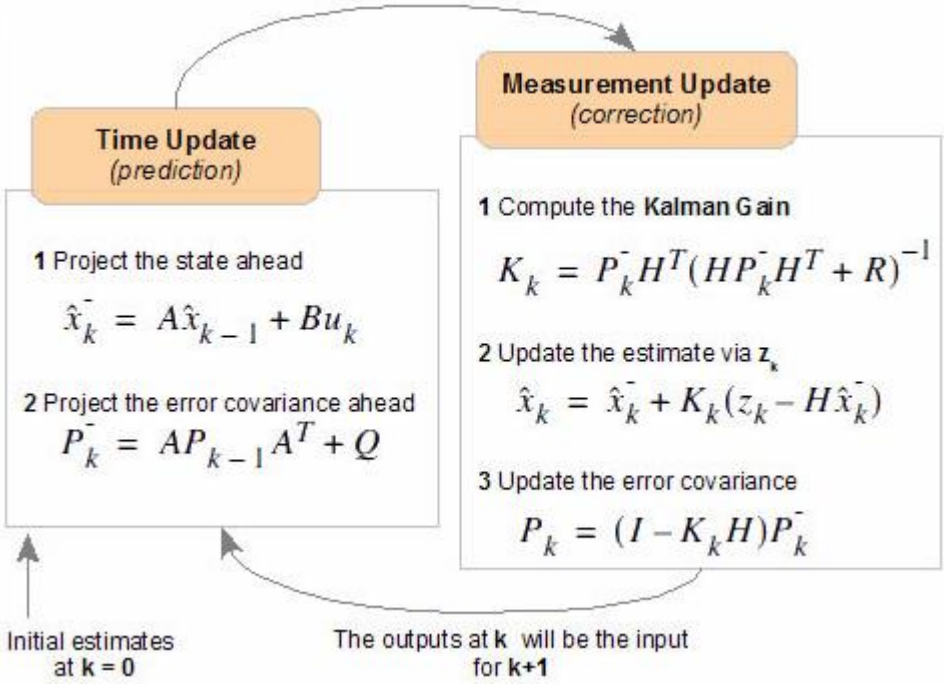


Image courtesy: Brown University

For today – Kalman Filter Basics



Kalman Gain (K) = Error in Estimate / (Error in Estimate + Measurement Error)

New Estimate = Old Estimate + K (Measurement - Old Estimate)

New Error in Estimate = (1 – K) (Old Error in Estimate)

Image courtesy: Bilgin Esme, Kalman Filter for Dummies

For today – Kalman Filter Localization

See the attached EdX slides