

SEARCH	Q
RESOURCES	
CONCEPTS	



More on Process Models

Later in the lesson I'm going to ask you to read a paper titled "[A comparative study of multiple-model algorithms for maneuvering target tracking](#)" but for now I'd like you to take a look **3.2 only**. This section, titled MM Tracking Algorithms' Design, discusses the 9 proc the earlier part of the paper.

Before you read the section, I'll explain some of the uncommon notation you will :

Notes on Notation

1. Matrix Notation

When you see something like the following:

$$F_{CV} = \text{diag}[F_2, F_2], F_2 = \begin{bmatrix} 1 & T \\ 0 & 1 \end{bmatrix}$$

it means that F is a 4x4 matrix, with F_2 as blocks along the diagonal. Written out

$$F_{CV} = \begin{bmatrix} 1 & T & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & T \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

2. State Space

The process models all use cartesian coordinates. The state space is

$$\mathbf{x} = \begin{bmatrix} x \\ \dot{x} \\ y \\ \dot{y} \end{bmatrix}$$

3. Variables

The equation $x_k = Fx_{k-1} + Gu_{k-1} + Gw_k$, $w_k \sim \mathcal{N}(0, Q)$ should be read as

the predicted state at time k (x_k) is given by evolving (F) the previous state (x_{k-1}), adding (G) the controls (u_{k-1}) given at the previous time step, and adding normally distributed noise (w_k).

The Paper

You can find the paper here: [A comparative study of multiple-model algorithms for maneuvering target tracking](#)

Supporting Materials

[A comparative study of multiple-model algorithms for maneuvering target tracking](#)

- ✓ 1. Introduction and Overview
- ✓ 2. I/O Recap
- ✓ 3. Model-Based vs Data-Driven A...
- ✓ 4. Which is Best?
- ✓ 5. Data Driven Example - Trajecto...
- ✓ 6. Trajectory Clustering 2 - Online...
- ✓ 7. Thinking about Model Based A...
- ✓ 8. Frenet Coordinates
- ✓ 9. Process Models
- ✓ 10. More on Process Models
- ✓ 11. Multimodal Estimation
- ✓ 12. Summary of Data Driven and ...
- ✓ 13. Overview of Hybrid Approach...
- ✓ 14. Intro to Naive Bayes
- ✓ 15. Naive Bayes Quiz
- ✓ 16. Implement Naive Bayes C++
- 17. Implement Naive Bayes C++ (...)
- 18. Conclusion

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