Autonomous Navigation for Flying Robots

Lecture 1.1: Welcome

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Course Goal

- **How can we enable a quadrocopter to fly autonomously?**
- How can we estimate its state from its sensor readings?
- How can we generate control commands to move it towards its goal?

Course Content by Week

1. Introduction, state-of-the-art
2. Linear algebra, 2D geometry
3. 3D geometry and sensors
4. Motors and motor controllers (PID)
5. Probabilistic state estimation
6. Bayes and Kalman filters
7. Visual odometry
8. Cutting edge research results

Course Organization

- Course duration: 8 weeks
- Video lectures
  - 30-45 minutes per week
- Interactive exercises
  - Quizzes, arithmetic problems
  - Hands-on programming exercises in Python

Upcoming Next

Lecture 1.2:

- Why quadrotors?
- Potential applications