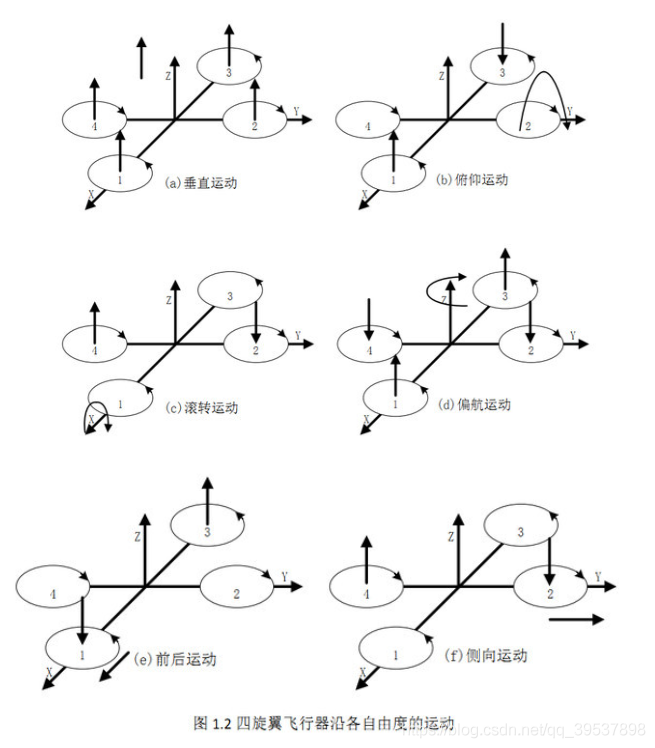
WEEK 1

**1. The robot has six degrees of freedom**

How many different ways can you rotate or translate the robot?



Yaw, Roll, Pitch

**2. In any system, ask how the following components work!**

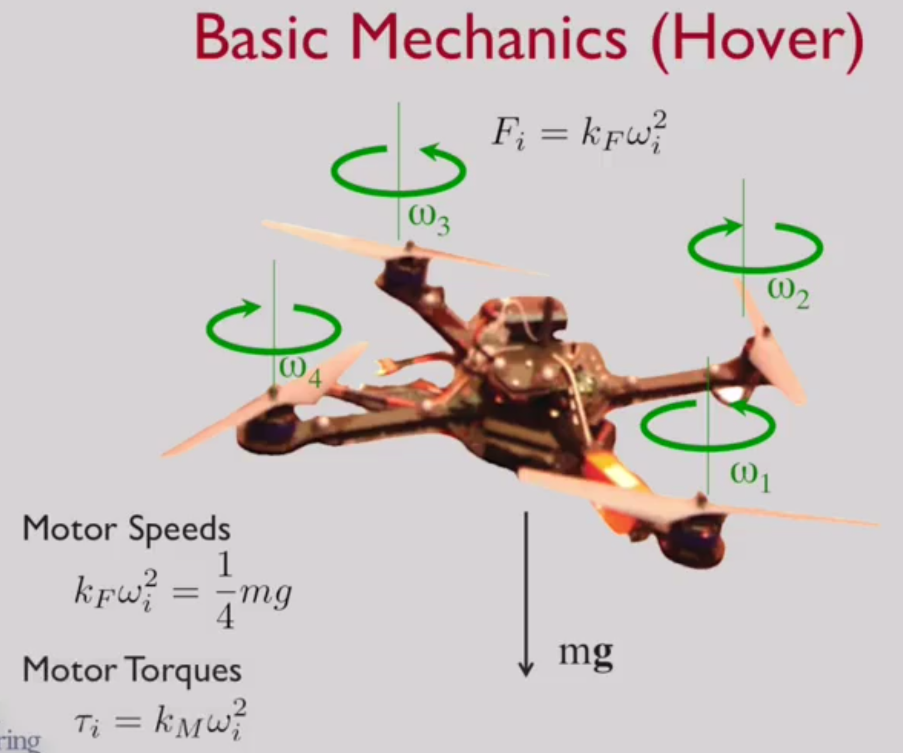
State Estimation

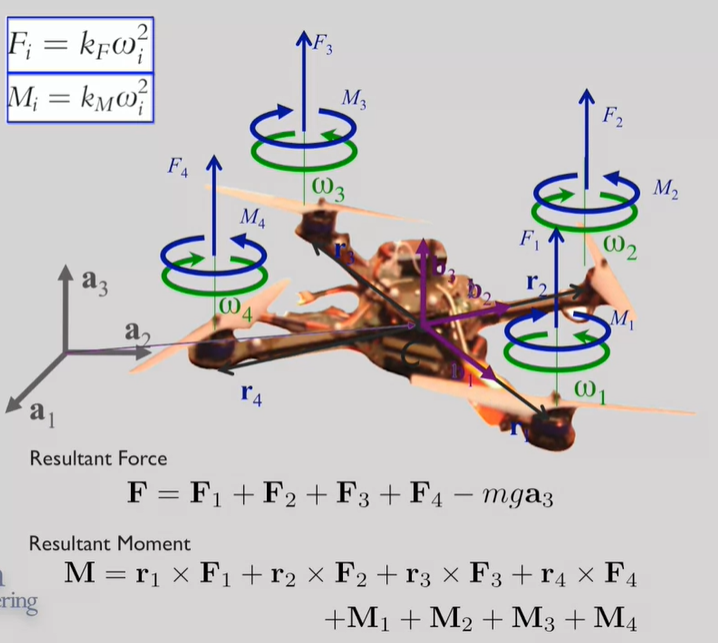
Control

Mapping (SLAM）

Planning

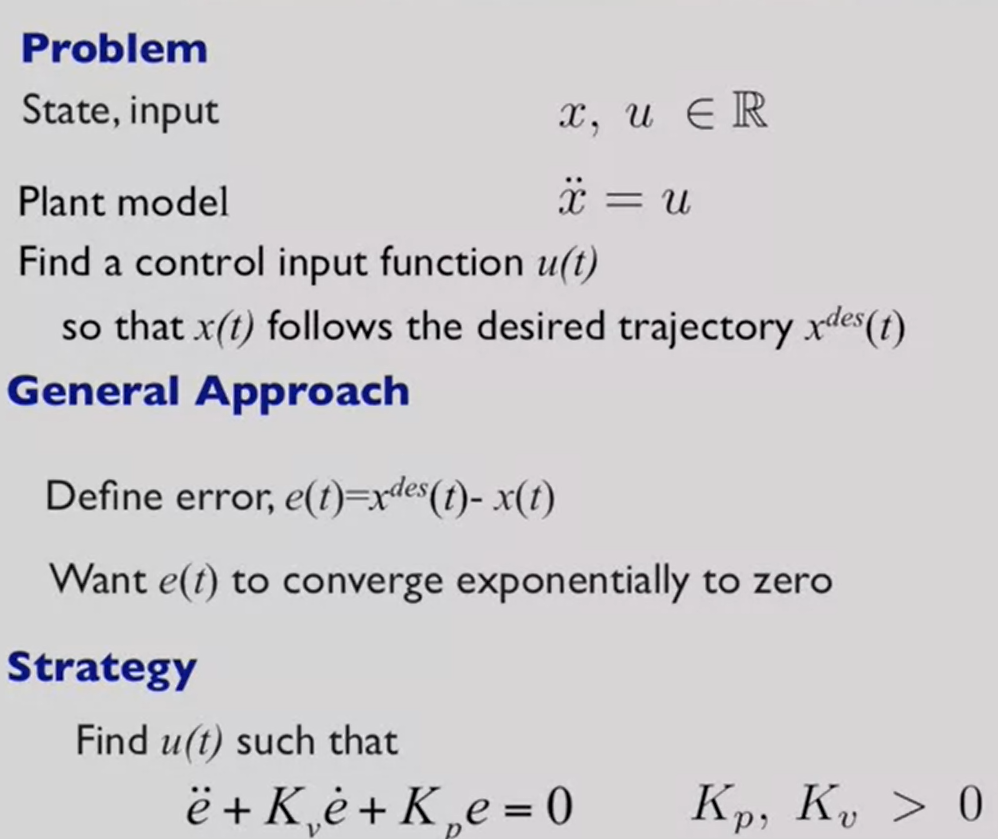
3. Basic Mechanics (Hover)



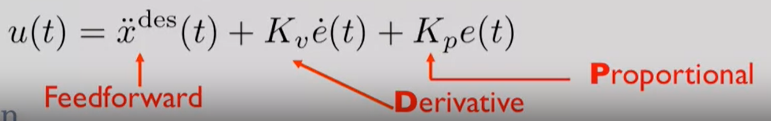


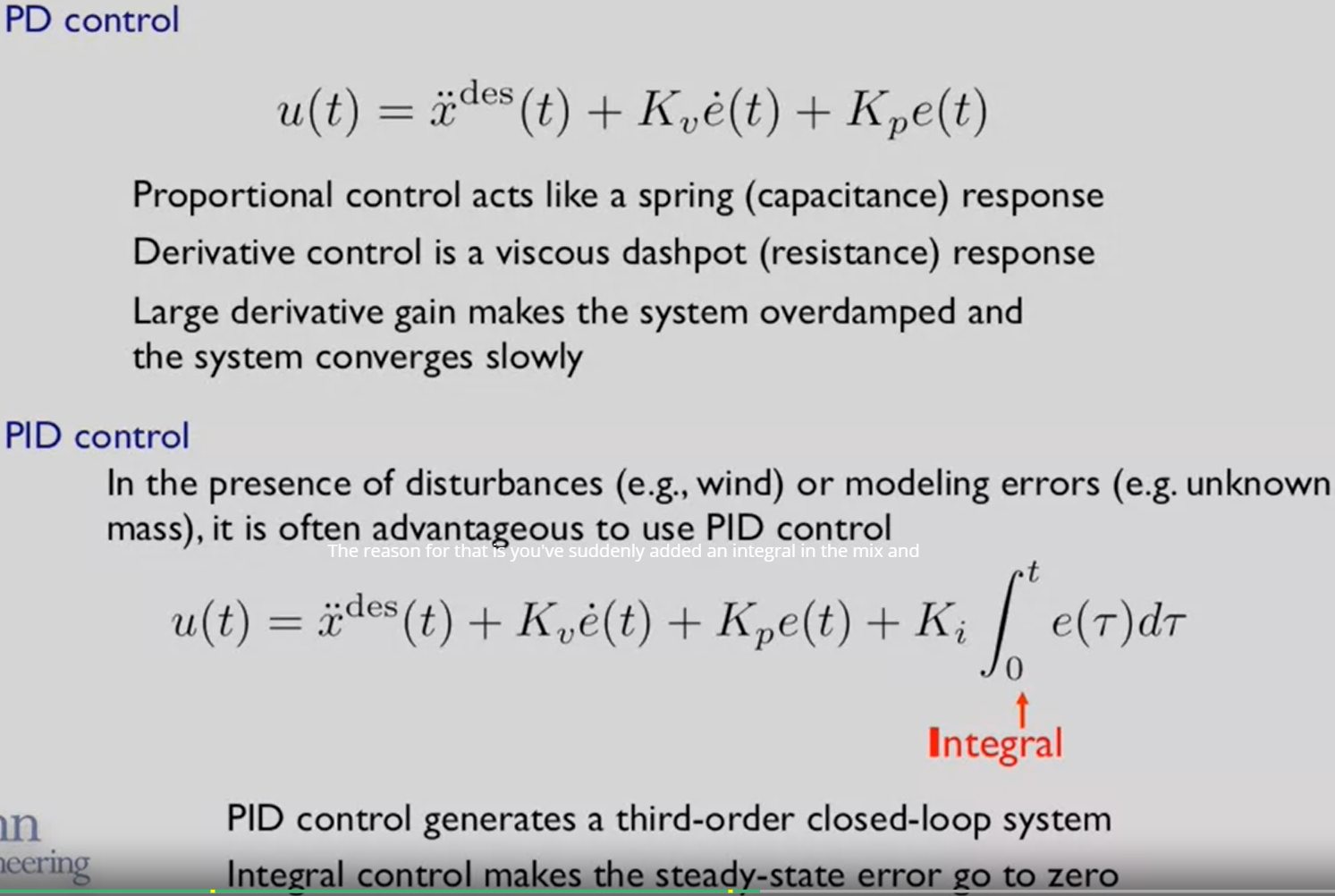
**3.1. Dynamics and 1-D Linear Control**

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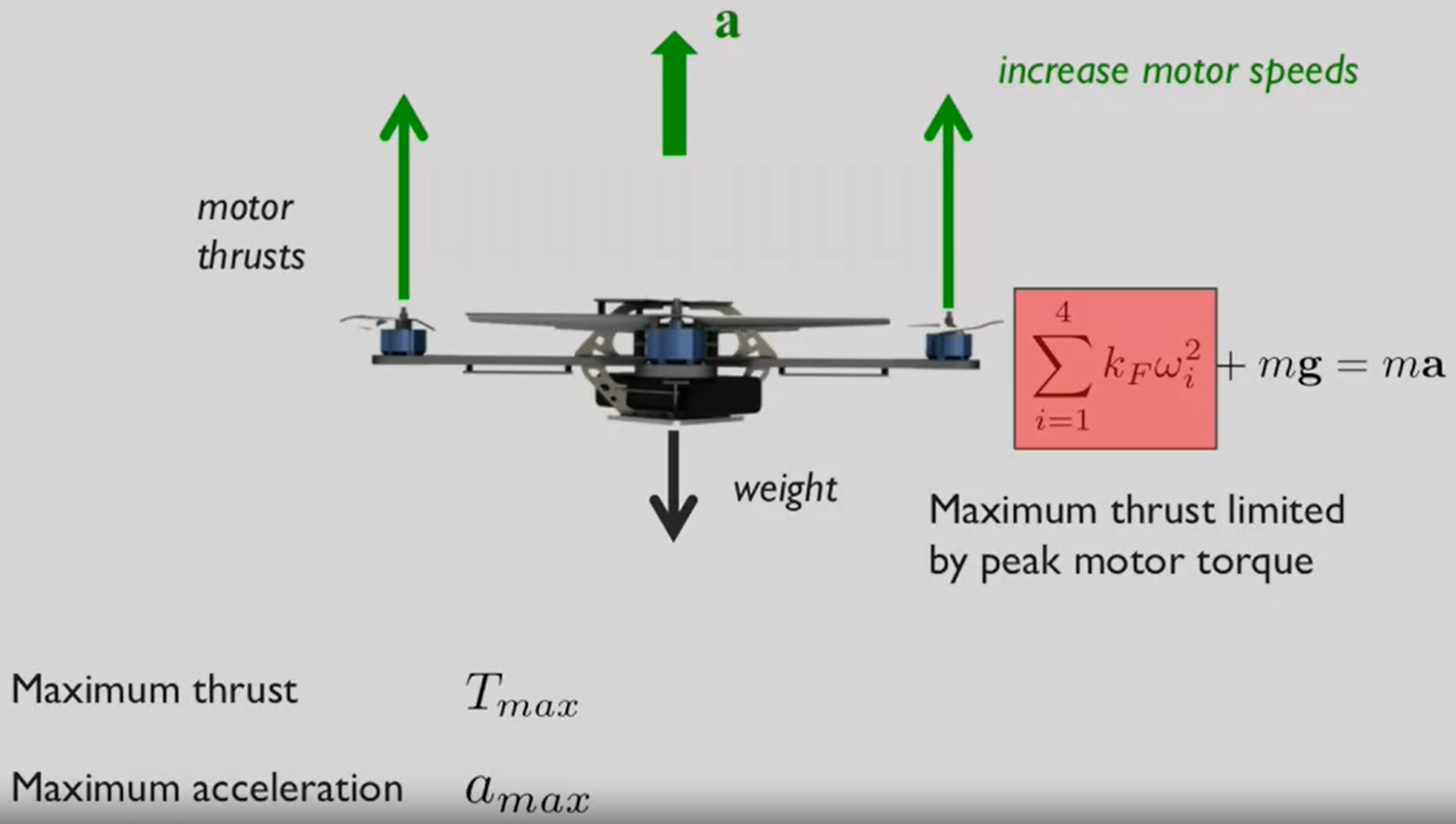
**PD control**

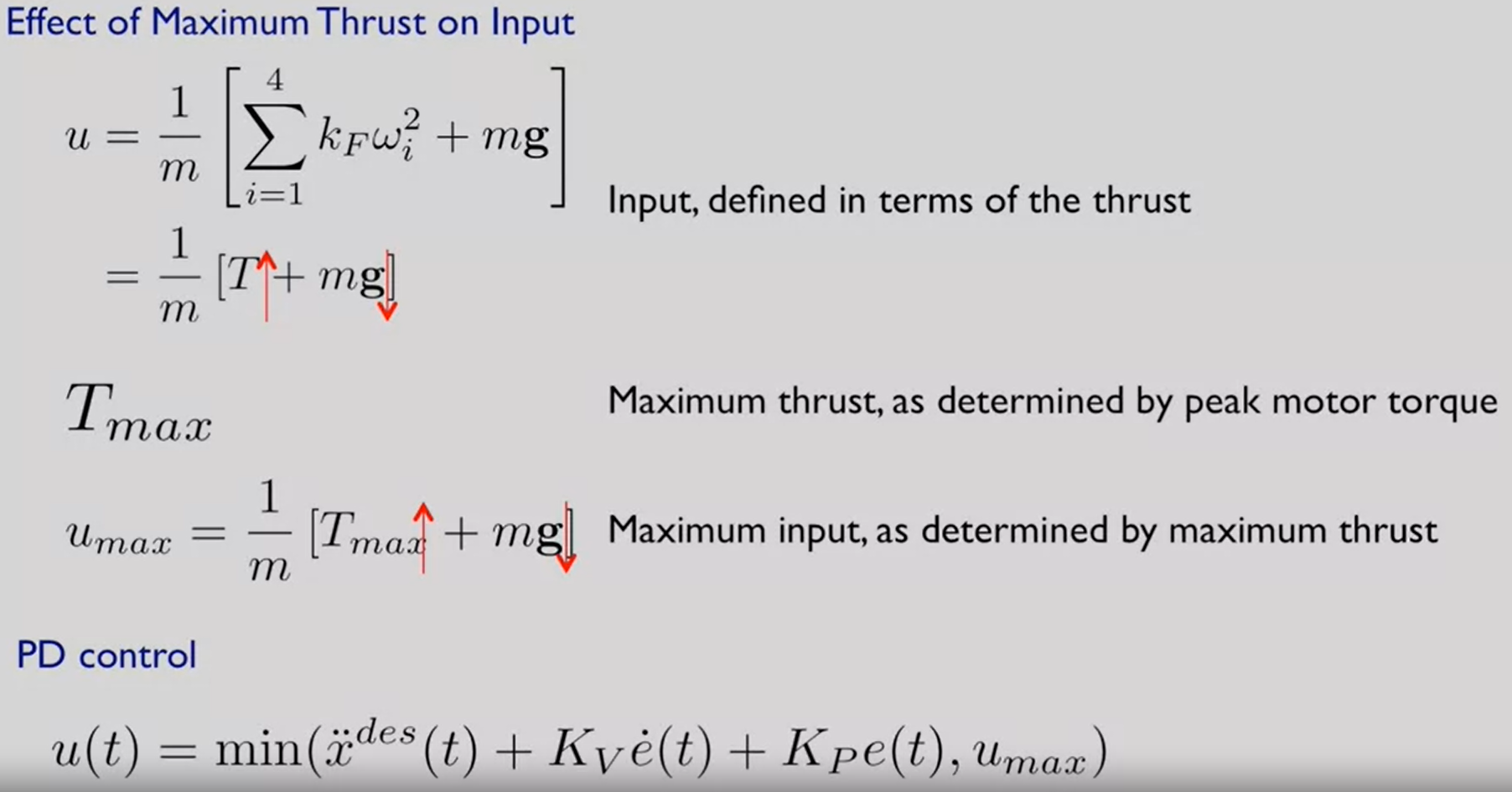


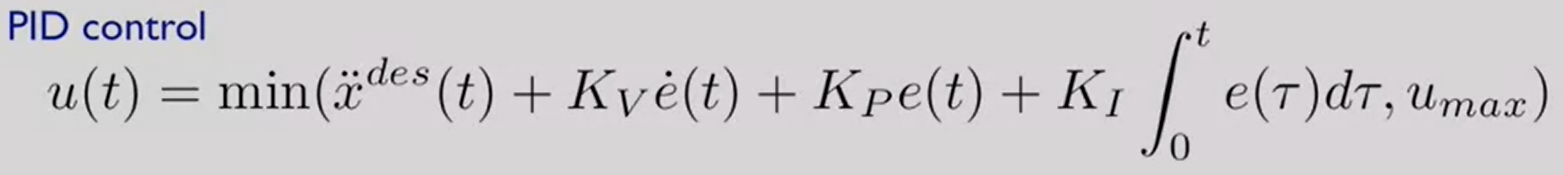


3.2. Design Considerations

Assume that we know maximum thrust







When consider system design, we must think about battery selection and power consumption

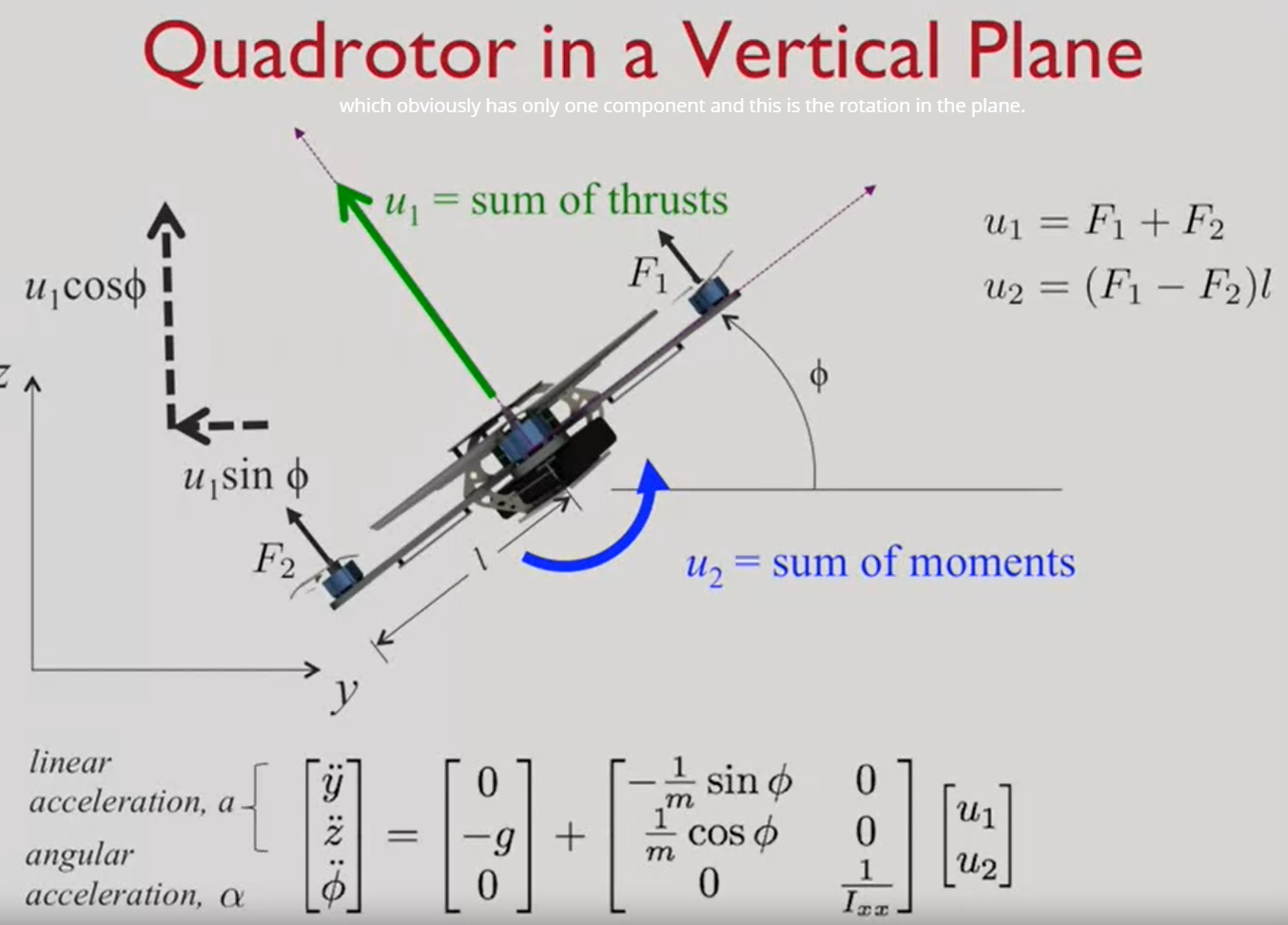
3.3. Agility and Maneuverability (nhanh nhẹn và cơ động)

- Maximum velocity to rest:

Maximize agility: minimize stopping distance

- Turn quickly without slowing down:

Maximize agility: minimize minimum turning radius



Two key ideas:

* Accelerate qickly

->maximize (linear acceleration) -> maximize (thrust/weight)

- Roll/pitch quickly

Maximize (angular acceleration) -> maximize (moment/inertia along x)

3.4. Component Selection

3.5. Effect of size



