

ME451: Control Systems

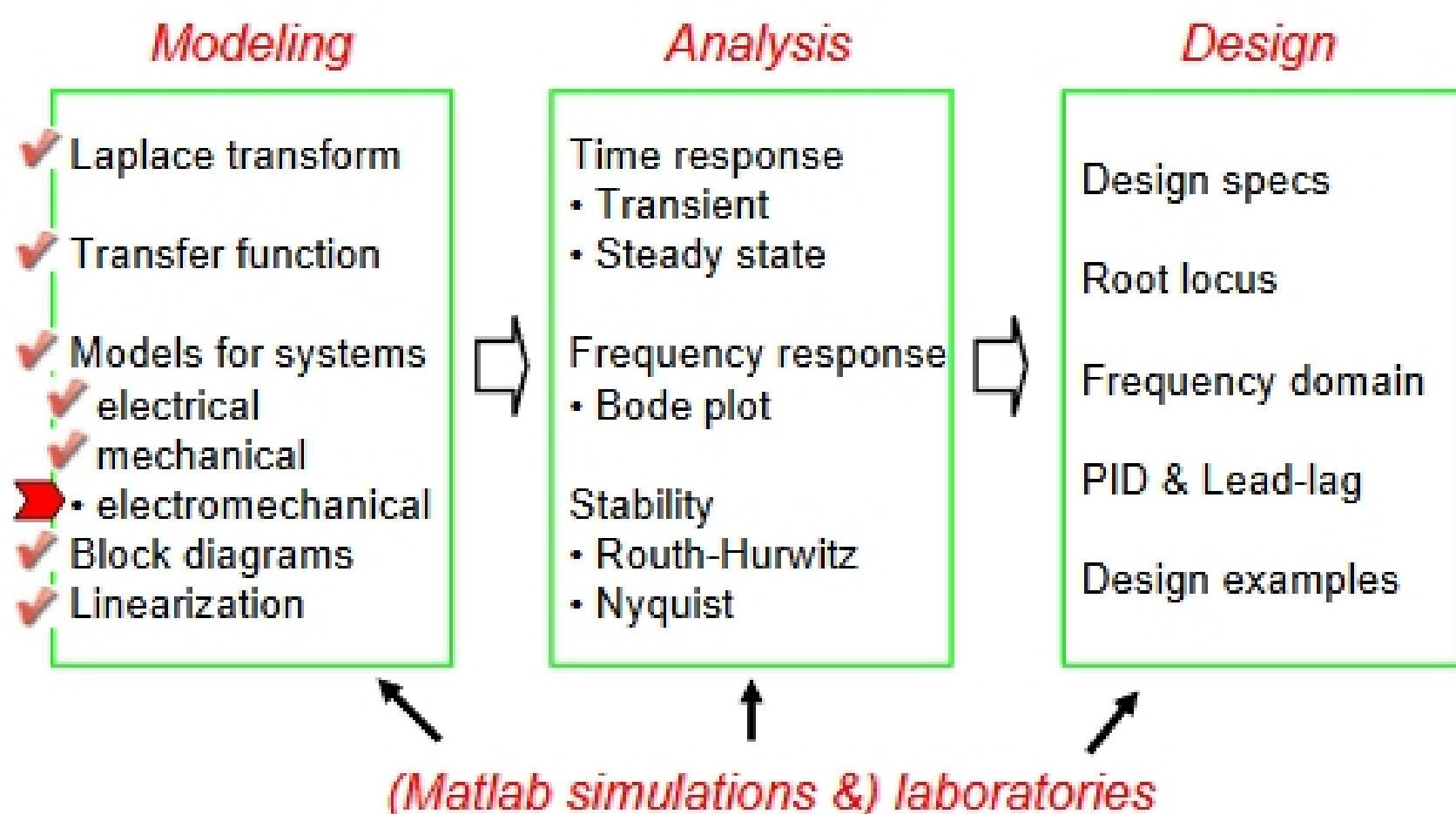
Lecture 8 Modeling of DC motors

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2008 Fall

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Course roadmap



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What is DC motor?

An actuator, converting electrical energy into rotational mechanical energy

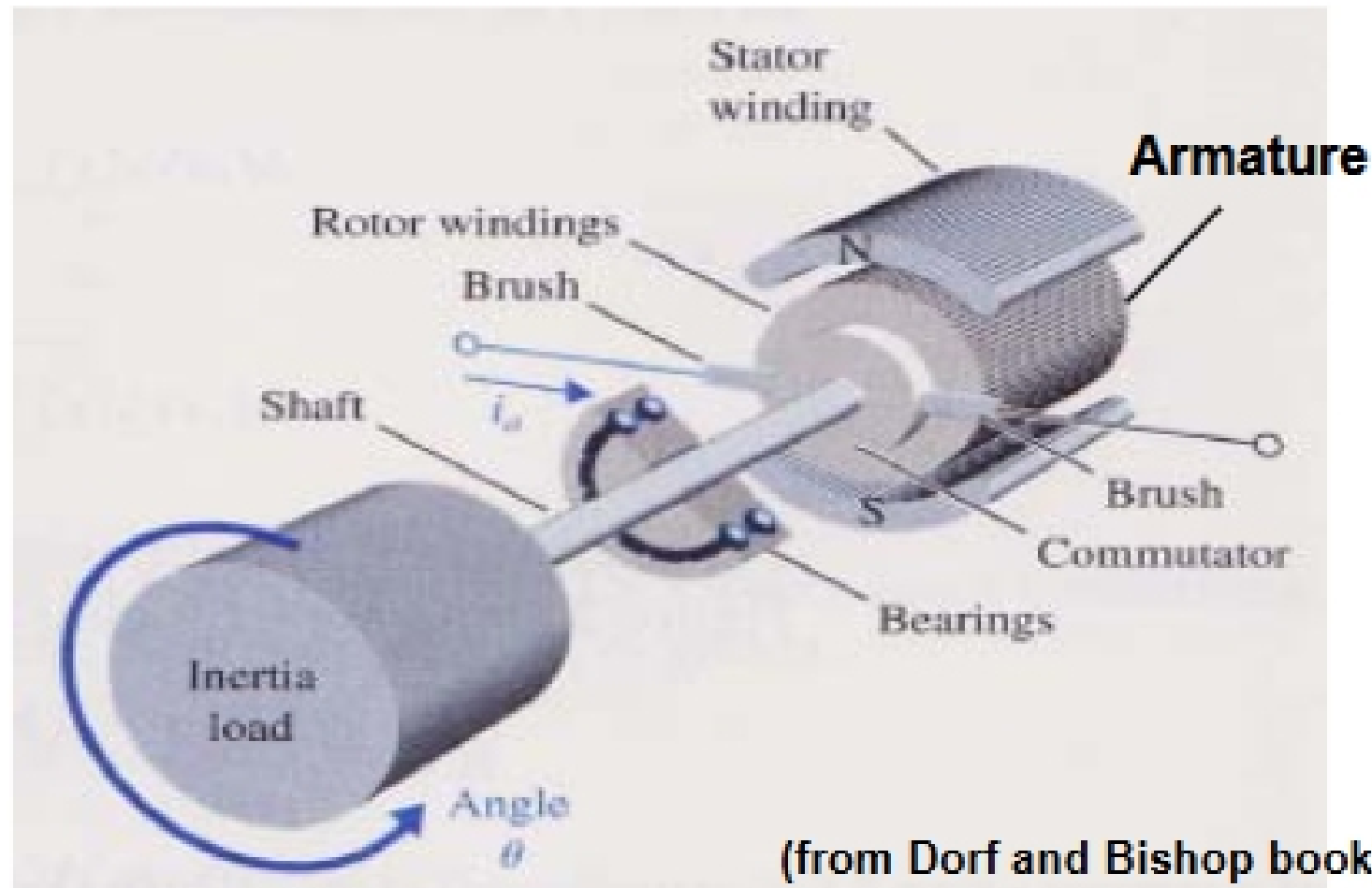


(You will see DC motor during Lab 1 and 4.)

Why DC motor?

- **Advantages:**
 - high torque
 - speed controllability
 - portability, etc.
- **Widely used in control applications:** robot, tape drives, printers, machine tool industries, radar tracking system, etc.
- **Used for moving loads when**
 - Rapid (microseconds) response is not required
 - Relatively low power is required

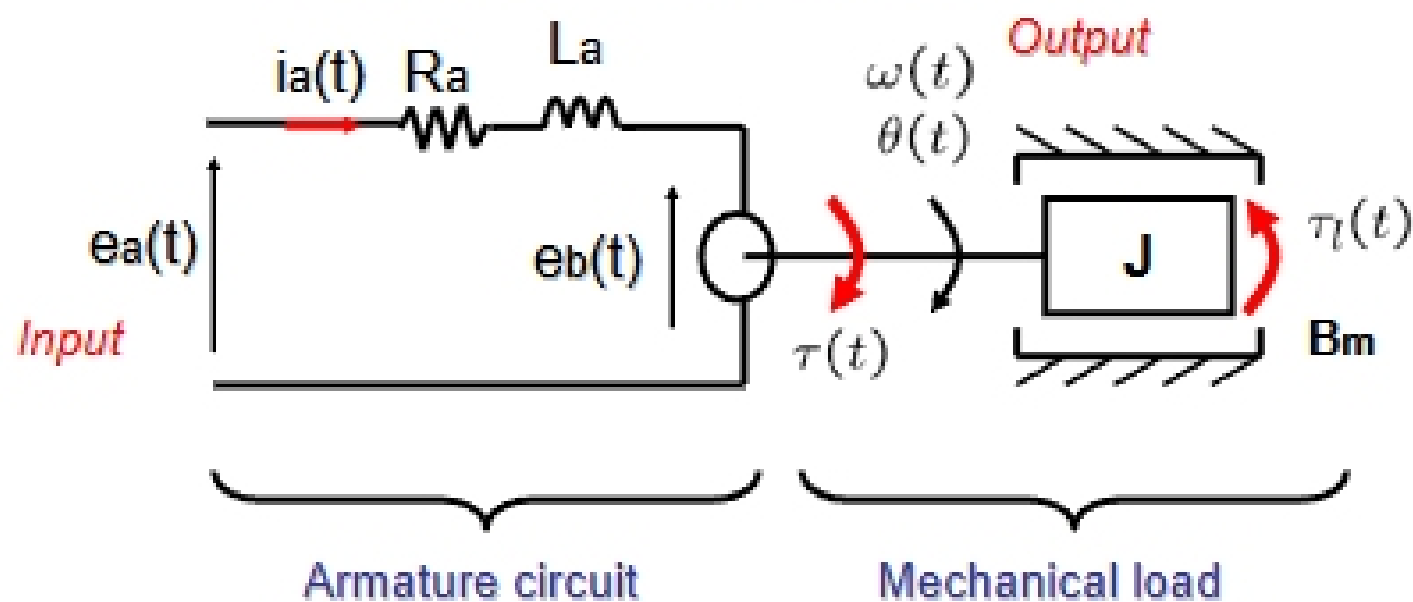
How does DC motor work?



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Model of DC motor



"a" : armature
 e_a : applied voltage
 i_a : armature current
 "b" : back EMF

mechanical
 θ : angular position
 ω : angular velocity
 J : rotor inertia
 B : viscous friction

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