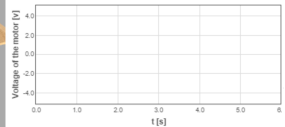
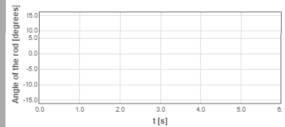
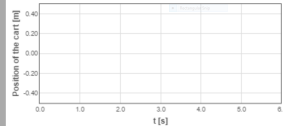
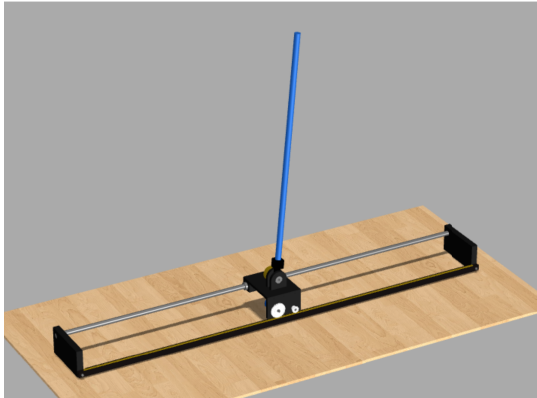


Outline

- 1 Basics
 - Control Theory
 - Demo: Inverted Pendulum
- 2 Control Goals
 - Examples
 - Exercise
- 3 Closed-loop systems
 - Sensitivity - Robustness
 - Types of systems and Steady State Error
 - Noise and disturbance rejection

Virtual Lab: Inverted Pendulum



Simulation	Setpoint of the cart [m]	Disturbance	Initial conditions	Camera view	Controller $u(t) = -K(x(t) - x_d(t))$
<input type="button" value="Start"/> <input type="button" value="Stop"/> <input type="button" value="Reset"/>	<input checked="" type="radio"/> Random Steps <input type="radio"/> Manual : 0	<input type="button" value="Push"/> <input type="button" value="Push"/>	Cart position [m]: 0 Rod angle [deg]: 5	<input type="button" value="Default"/> <input type="button" value="Front"/> <input type="button" value="Top"/>	k1: -9.1287 k2: -52.4975 k3: -14.9912 k4: -6.3533 <input type="button" value="Default"/>

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