Reactive Balance Control in Walking based on a Bipedal Linear Inverted Pendulum Model

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Biomechanics and Motor Controls
Final Presentation
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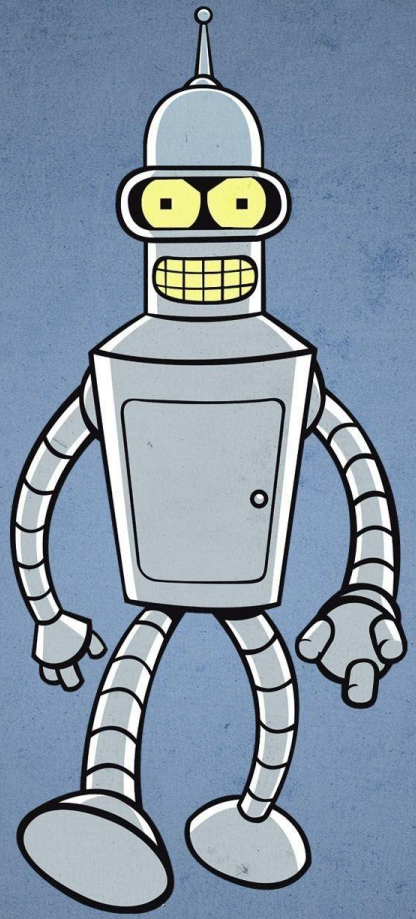


Anything less than immortality
is a complete waste of time

Carnegie Mellon
ENGINEERING

1 Leg

- Kangaroo

2 Leg

- Ostrich
- Human

3 Leg

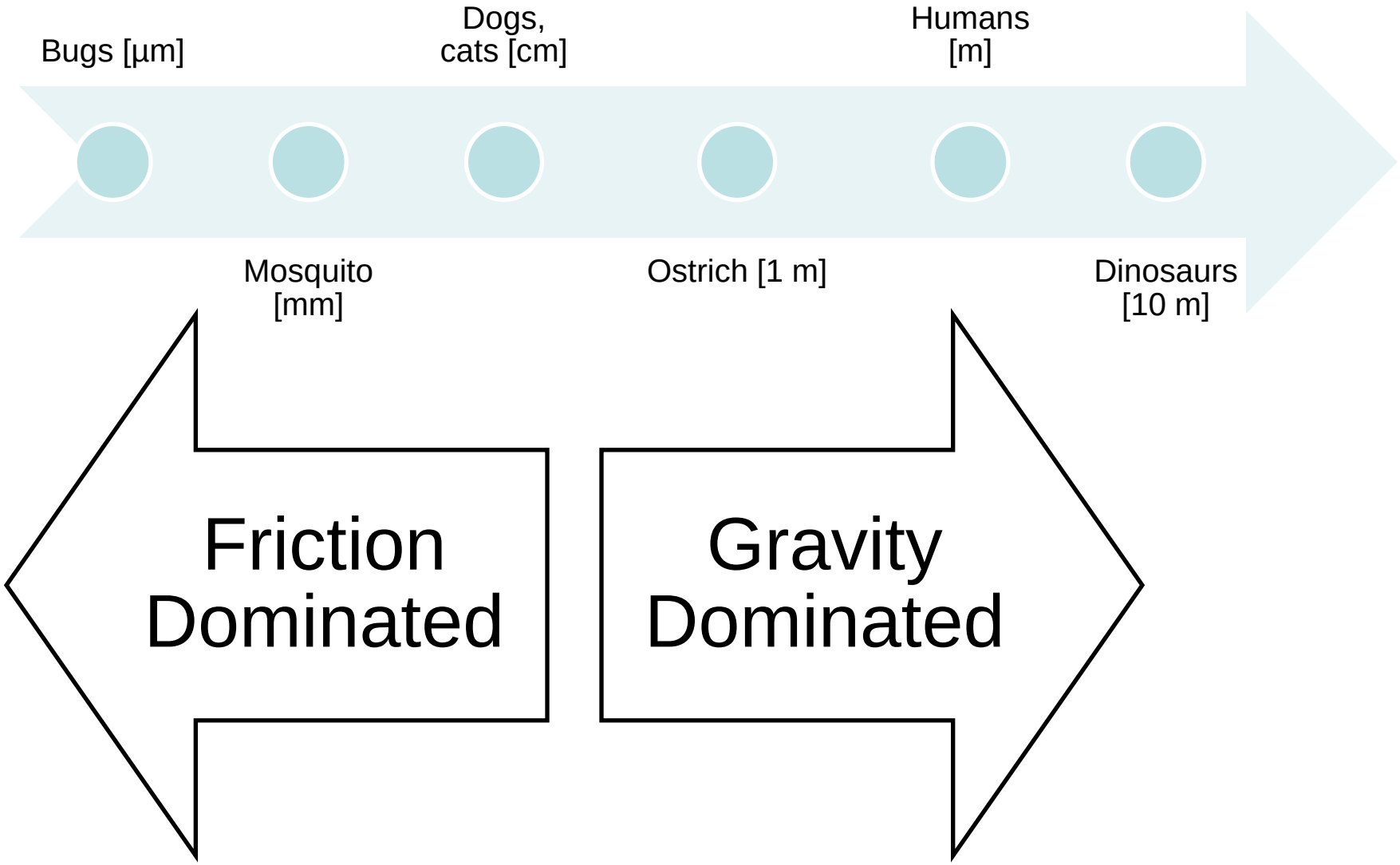
- Amputated Dog ?!

4 Leg

- Cats
- Dogs

6 Leg

- Cockroach

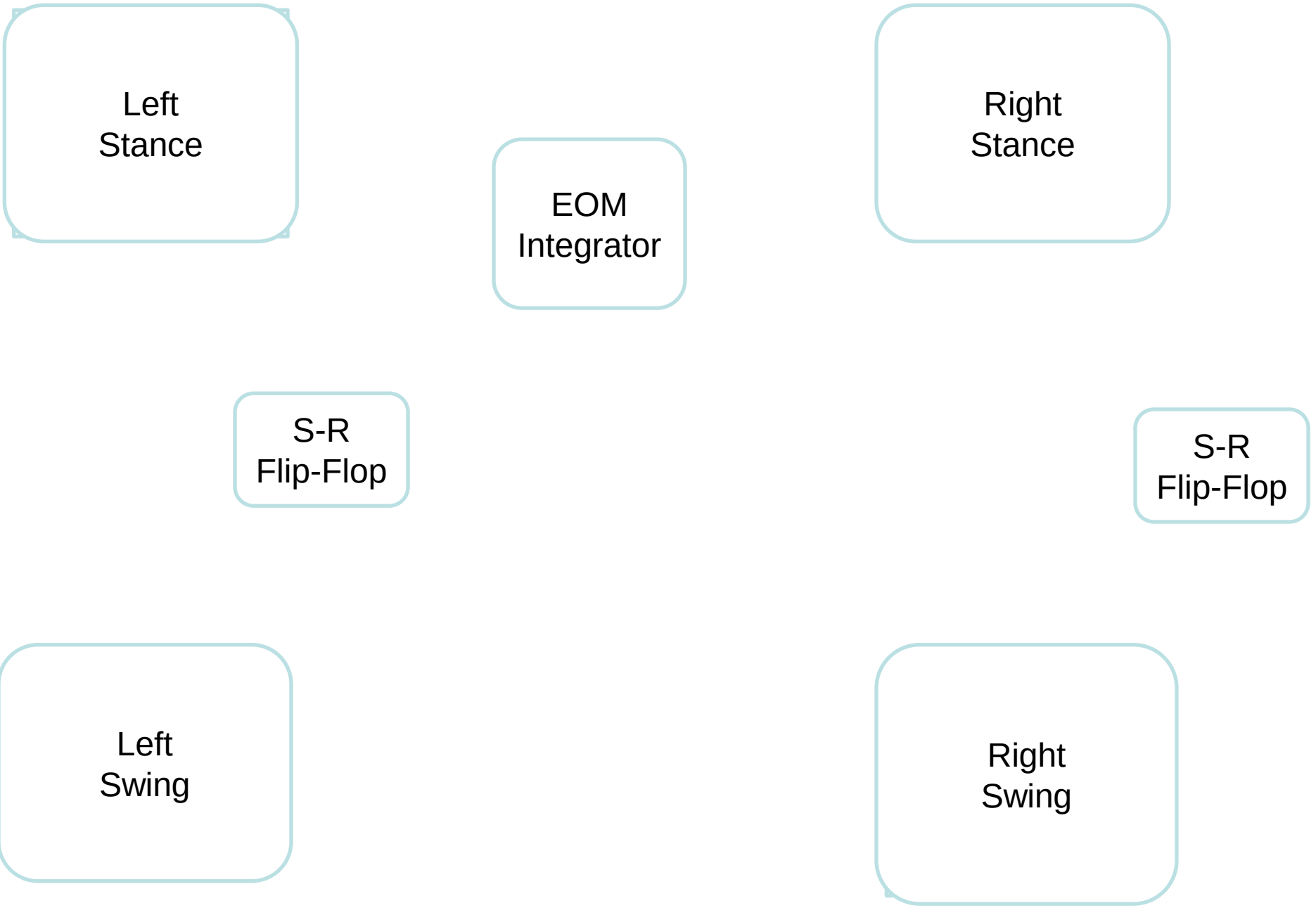

Bugs [µm]
Dogs, cats [cm]
Humans [m]
Mosquito [mm]
Ostrich [1 m]
Dinosaurs [10 m]
Friction Dominated
Gravity Dominated

Objective

- Develop a reactive balance controller for foot placement in biped legged locomotion
- Verify the results from F.Parietti, G.Hartmut (2011)

Motivation

- A simple model for gait analysis
- Base for Biped Linear inverted Pendulum (bLIP) model in 3D

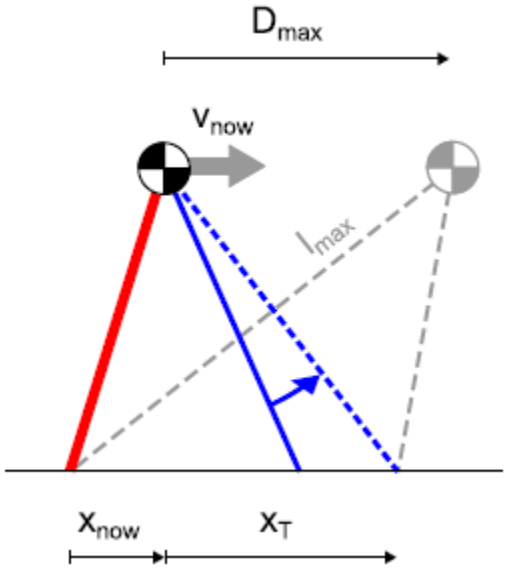

Left
Stance
EOM
Integrator
Right
Stance
S-R
Flip-Flop
S-R
Flip-Flop
Left
Swing
Right
Swing

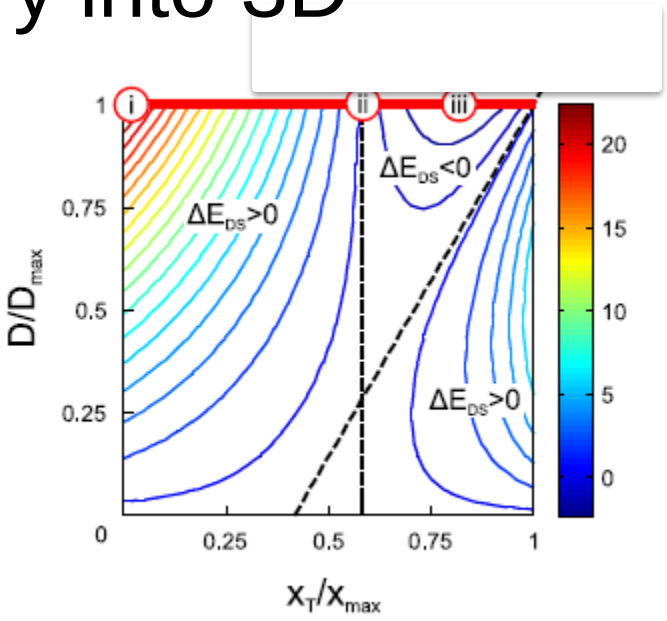
Results

- Matlab-Simulink Simulation of BLIP

Future Work

- Debug the controller model
- Compare results with results from F.Parietti, G.Hartmut (2011)
- Extend the theory into 3D





Questions?