

Legged Robots Practicals – Week 1

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1 Introduction

In the first weeks we will explore the two-link pendulum to control a quadruped leg. Please refer to the slides for additional details. In the first week we derived the kinematics and dynamics of the double pendulum. In the following weeks we will derive the Jacobian and two methods to compute the inverse kinematics, which will be used to develop a simple hopping controller. In this first session, you will set up your coding environment and derive the kinematics and dynamics of the double pendulum yourself.

2 Code Installation

The code is hosted at <https://gitlab.epfl.ch/lgevers/lr-practicals>. The README.md gives details on installation and code structure. The repository contains the code for all the practicals of week 1-3. In this session you will only work on `practical1.py` (or `practical1.ipynb` if you prefer to work with a Jupyter notebook).

3 Assignment: Double Pendulum Kinematics and Dynamics

Fill in the kinematic and dynamics equations in `practical1.py` (or `practical1.ipynb`). Your equations will be used to simulate a double pendulum at the end of the script. Watch the generated video to verify the validity of your equations.

Note: if you are unfamiliar with symbolic computation, check out the sympy documentation (<https://docs.sympy.org/latest/tutorials/intro-tutorial/intro.html>).