

Homework 5

The Countermovement Jump is a vertical jump test in which an athlete quickly squats and then jumps as high as possible.



During an experiment, the vertical displacement of an athlete was measured. Calculate the velocity and the acceleration. How would you eliminate the noise from the data? Plot the displacement, velocity and acceleration against time using the raw data and the denoised data.

Laboratory work 1 – Read/write, using Matlab functions to smooth the data

First read in the data and convert the table to a matrix if necessary (see *readtable* and *table2array*). The first column is the time in seconds; the second column is the vertical displacement in meters.

Calculate the velocity and acceleration using the raw data and the smoothed data and display them (plot). Smooth the data using different methods and window sizes (build-in Matlab function).

Laboratory work 2 – weighted smoothing function

Write a function in Matlab that smooths data. The window size must be 5 and the following weights are used: 1, 2, 5, 2, 1. Use your smoothing function to smooth the data and plot displacement, velocity and acceleration.

Explore next Matlab functions: *fibonacci*, *flip*, *flipud*, *fliplr*

Homework

Write a function in Matlab to smooth data. The function should allow the use of different window sizes (e.g. 7, 9, 11, 13, ..., 31, ...) and the weights should be defined as a Fibonacci sequence (except zero).