simulation\_speed\_switching.m

Start from here. This is like a “main” file from where the execution can be controlled. In this code you can set the desired speeds to which you want the biped to go to, and the biped achieves them by switching among exponentially stable periodic orbits designed for different speeds.

Fixed\_Point\_Lib/fp\_F=0/fps\_lib\_coarse.mat

This file holds the data about all (79) exponentially stable fixed orbits (fixed points/gaits). Each row holds information about 1 gait. The data structure is as follows: first column is the nominal speed of the orbit in m/s, second column helps in generating the control parameters that result in this limit cycle using G (defined below), third to twelfth column holds the fixed point, i.e. the state on the orbit at the beginning of the swing phase, thirteenth column holds the zeta^\*; see Section III of Veer et al CDC 2017 for the meaning of zeta^\*. Finally, the last column holds the lower limit of zeta below which the state would not be in the basin of attraction of the orbit on the zero dynamics manifold.

'fixedpointforfivelink/Switching\_Control/fixed\_point\_F=0\_time\_beta\_jacobian.mat

jacobian of average speed w.r.t the control parameters beta; it is the jacobian being pseudo-inversed in equation (22) in Veer et al CDC 2017. Represented as G in simulation\_speed\_switching.