

What does a real time factor of 1 mean? How about a real time factor smaller than 1?

(From the exercise:)

Real time factor is the actual duration of the simulations (get it from `sIn`) to the time it takes for MATLAB to animate the simulations (get it from `t_anim`).

A real time factor of 1 hence indicates that the animation (all computation concerning the simulation and visualization combined) takes the same amount of time to compute than the modelled time constants of the dynamics of the modelled system take to change the state.

Similarly, a real time factor smaller than 1 suggests that the animation takes even longer to compute than the modeled system changes state in real time.

How does 'skip' effect this value?

The skip value is equivalent to a reduction factor of visualized states, which reduces the animation time. Thereby, an increasing skip value decreases the animation time.

Note that the `visualize.m` function has an extra input `r0` which is the position of the stance foot in the global frame. Why do we need this?

The dynamics of the system are modeled in a local “walker” coordinate system, that is centered around the foot position of the stance leg. With every impact, the generalized coordinates are remapped such that the foot of the stance leg remains in the origin of this local coordinate system. In cartesian coordinates, this transformation can be described by a translation vector `r0`, which intuitively describes the step vector connecting the position of the stance foot over consecutive stance phases.

For the visualization, we have to apply this translation also to the local coordinate system, such that the walker is transformed, and “walks”, in the global (visualized) coordinate system.