Inverse Kinematics Tool based on Kalman Smoothing

Input and parameters

You can use the Inverse Kinematics KS Tool with the same input and setup files as the Inverse Kinematics Tool.

The algorithm determines the uncertainty of a measured marker position by inverting the user provided weight. For this reason, zero weights are not allowed and are internally replaced by 0.01. If you want to discard a marker, you can set the apply-flag in the IK Task Set to false.

It is possible to provide additional parameters in the setup-file.

order   Order of the filter. Derivatives of the generalized coordinates up to order K+1 will be estimated.

timeScale   Scale factor for time. For numerical reasons, choose timeScale such that the generalized coordinates and their derivatives have the same order of magnitude.

sdProcess   Estimate of standard deviation of the (K+1)th derivative of the generalized coordinates with K the order of the filter.

sdMeas   Estimate of standard deviation of the marker error.

For a more detailed description of the meaning of these parameters, the user is referred to De Groote et al. (2008).

A zero position in the trc-file is interpreted as a **missing marker**. The Kalman smoothing algorithm is able to cope with missing markers. It is preferable not to interpolate missing markers.

How to use the InverseKinematicsKSTool from the command line?

1. Download KS_install.zip and unzip to a folder of your choice further referred to as C:\...\KS_install.
2. Add C:\...\KS_install to your path.
    (Go to Computer -> System Properties -> Advanced system settings -> Environment Variables, select Path and click Edith).
3. Run ks from the command line using the same syntax as for ik.
    (Open a Command Prompt. Go to the folder where you saved your setup file e.g. the gait2354 example distributed with the OpenSim installation. Call the InverseKinematicsKSTool using the comman `ks -S Subject01_Setup_IK.xml`. Alternatively, you can use Subject01_Setup_KS.xml specifying the additional Kalman smoothing parameters.)