Sensitivity study du02 - Calibration prestretch bounds

In this sensitivity study we used force-driven simulations starting with the model in the imaging position, applying four different loads for AP, IE and VV. Only one ligament prestretch was changed at the same time, where the other three ligament prestretch values were set to 1.0. Eight different Python scripts were run, two AP scripts (ACL & PCL), four IE scripts (ACL, PCL, MCL & LCL) and two VV scripts (MCL & LCL). Four separate simulations with different applied forces were applied per script:

- AP simulations: -50N, 50N, -100N, 100N
- IE simulations: -500Nmm, 500Nmm, -1000Nmm, 1000Nmm
- VV simulations: -500Nmm, 500Nmm, -1000Nmm, 1000Nmm

In this sensitivity study the following prestretch value ranges were investigated (in steps of 0.01):

ACL = 0.80 - 1.04
PCL = 0.80 - 1.04
MCL = 0.80 - 1.04
LCL = 0.80 - 1.04

The results are shown in: *Calibration prestretch bounds - DU02.pptx*

To investigate the results we looked at run time, resulting kinematics and converged time steps. These results showed the following ranges of ligament prestretch factors being stable:

ACL = 0.88 - 1.04
PCL = 0.86 - 1.04
MCL = 0.89 - 1.04
LCL = 0.93 - 1.04

The sensitivity study only tried values of up to 1.04, where the models still run with ligaments with higher prestretch values (at least up to 1.20).