FP_Auto_Baseline

Introduction

Setting the Force Platform Zero parameters for Instrumented Treadmills can be quite challenging because the unloaded frames aren't readily identified automatically, and one would prefer to use all of the unloaded frames for determining the zero range.

For Visual3D Version 6 we have introduced a new pipeline command:

```
\\ FP_Auto_Baseline\\ ! /FP_NUMBER=\\ ! /AUTO_ZERO=TRUE\\ !
/AUTO_FP_MINIMUM=TRUE\\ ! /USE_REDUCED_FP_MINIMUM_AROUND_FORCE=TRUE\\ !
/REDUCED_FP_MINIMUM=5.0\\ ;\\
```

Background

This command does three things:

1. Zeros the force signal without having to specify a frame range (AUTO_ZERO)
2. Defines the minimum force platform value based on the noise in the signal (AUTO_FP_MINIMUM)
3. Looks at the before/after the signal loaded - and finds when the signal crosses the reduced FP minimum to ensure as much of the signal is used as possible (USE_REDUCED_FP_MINIMUM_AROUND_FORCE)

The minimum force platform value is determined by identifying the values of the plate during all the periods where the plate is unloaded. Each force component is used to determine the set of frames containing median values for each component, and a single representative minimum force frame is determined from these values.

Parameters

FP Number

FP_NUMBER= An empty parameter will work on all plates in the C3D file. Or you can specify individual plate numbers, separated by a plus sign (ex. /FP_NUMBER=1+3).

Auto Zero

AUTO_ZERO= This parameter is used to zero the signal. The value of the zero baseline is stored in the C3D parameter FORCE_PLATFORM::BASELINES

This parameter would be used in place of the baseline parameter in the force platform parameters.

Auto FP Minimum

AUTO_FP_MINIMUM= Visual3D determines the minimum force platform value by finding when the platform is unloaded and the maximum noise value is found. This ensures the minimum value is used, and less data is lost compared to setting an arbitrary minimum force platform value.

To see what value is picked, after running the command, select an individual C3D file, and go to Force→ Modify Minimum Force Platform Value. The “Current Minimum” will reflect the value found by the command.

Reduced FP Minimum Around Force

USE_REDUCED_FP_MINIMUM_AROUND_FORCE= Visual3D determines when the force platform is loaded, and finds when the signal drops below the specified minimum value (REDUCED_FP_MINIMUM).

REDUCED_FP_MINIMUM = Used when USE_REDUCED_FP_MINIMUM_AROUND_FORCE parameter is set to TRUE

Why is this parameter so important? When there are two platforms in the treadmill there may be times when one foot is on two platforms (the other foot is not). The transitions from one foot on one platform to two platforms (or vice-versa) often causes an artifact (sudden change) in the force signal that is about the magnitude of the minimum force threshold. This artifact is most commonly seen with a front to back treadmill than a side to side. This parameter is used to resolve this discontinuity by using an alternate minimum force surrounding known contiguous force intervals to include relevant force readings that may be below the noise threshold, but still rising or lowering from the REDUCED_FP_MINIMUM value. This avoids the FP Minimum value discontinuity when FP transitions occur and combines the two signals into one force and cop signal, then reapplies the force minimum threshold.