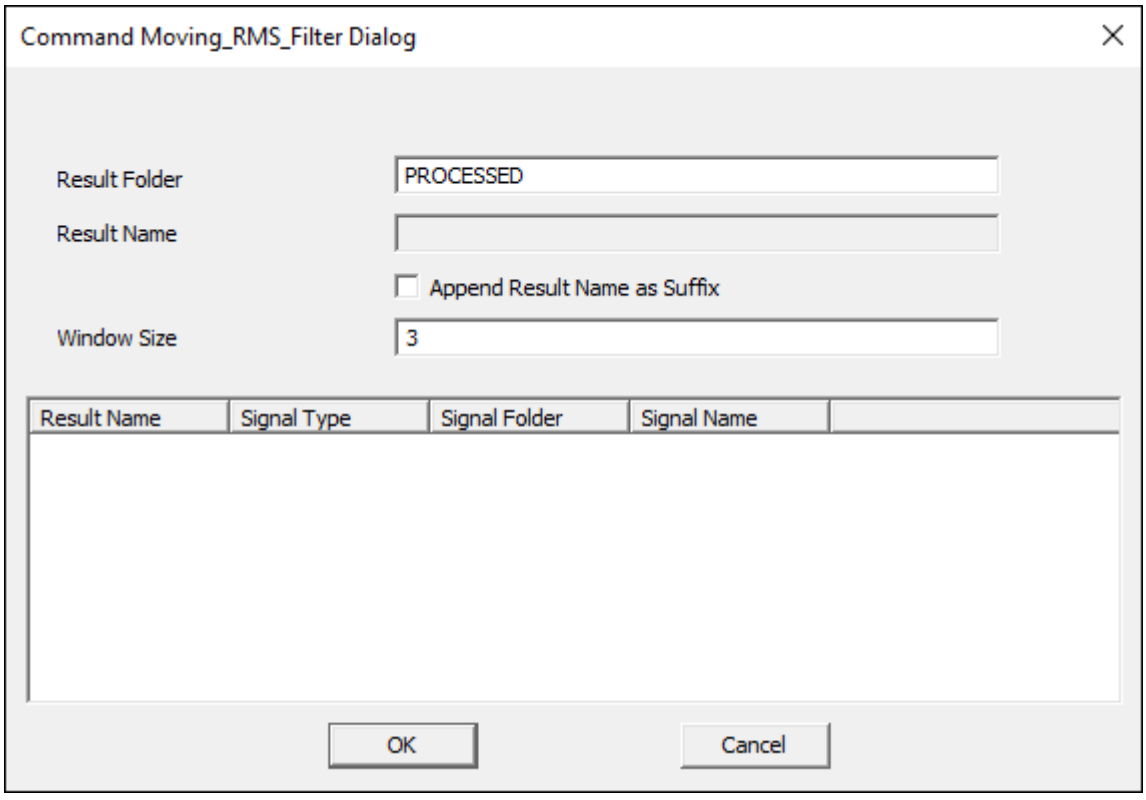
Moving_RMS

The **Moving_RMS** command computes the linear envelope of a signal (typically an EMG signal) by calculating the RMS value within a moving window. The RMS is described here

The number of frames in the window must be an odd number. The output value at each frame is the RMS of the window centered on that frame.

```
Moving_RMS
! /Signal_Types=
! /Signal_Folder=ORIGINAL
! /Signal_Names=
! /RESULT_TYPES=
! /RESULT_FOLDERS=PROCESSED
! /RESULT_NAME=
! /APPLY_AS_SUFFIX_TO_SIGNAL_NAME=
! /NUM_WINDOW_FRAMES=3
;
```



Frame Window

The command Moving_RMS computes the RMS of a signal by calculating the RMS value for short successive time periods (the time period is described as a moving window). In Visual3D the windows overlap. The output value at each frame is the RMS of the window centered on that frame (e.g. the RMS value for each window is plotted at the time corresponding to its center) so the number of frames in the window must be an odd number.

So, if the window was 11 frames.

- The first output frame is frame 6 computed from frames 1-11.
- The second output frame is frame 7 computed from frames 2-12 Etc.

Typically, this window is reported as a time. Since the number of frames is dependent on the sampling rate, you must convert the time (in seconds) to frames. The sampling rate is specified in the C3D file under PARAMETER::ANALOG::RATE.

To convert time to frames, you must multiply the time by the sampling rate and add 1 (time 0.0 is equal to frame 1). This as an expression is:
(time * PARAMETER::ANALOG::RATE) + 1

To specify a frame window of 100 ms (0.1 seconds), would be specified as:
/NUM_WINDOW_FRAMES=(0.1 * PARAMETER::ANALOG::RATE) + 1

Pipeline commands for specifying a window of 100 ms

A more typical window for the RMS filter is 100 ms, which can be achieved as follows:

```
! ------------------------------------------
! compute a moving rms with a window of 100 ms
! ------------------------------------------

Moving_RMS
/SIGNAL_TYPES=ANALOG
/SIGNAL_FOLDER=ORIGINAL
/SIGNAL_NAMES=EMG1+EMG2
/RESULT_TYPES=ANALOG
/RESULT_FOLDERS=RMS
/RESULT_NAME=
/APPLY_AS_SUFFIX_TO_SIGNAL_NAME=TRUE
/NUM_WINDOW_FRAMES=(0.1*PARAMETER::ANALOG::RATE)+1
;
```

Pipeline commands for specifying a window of 150 ms

To specify a 150 ms (0.15 seconds) window for the RMS, the commands are as follows:

```
! ------------------------------------------
! compute a moving rms with a window of 150 ms
! ------------------------------------------

Moving_RMS
/SIGNAL_TYPES=ANALOG
/SIGNAL_FOLDER=ORIGINAL
/SIGNAL_NAMES=EMG1+EMG2
```

```
/RESULT_TYPES=ANALOG
/RESULT_FOLDERS=RMS
/RESULT_NAME=
/APPLY_AS_SUFFIX_TO_SIGNAL_NAME=TRUE
/NUM_WINDOW_FRAMES=(0.15*PARAMETER::ANALOG::RATE)+1
;
```

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