

Metric Interquartile

Overview

The **Metric Interquartile** command is used to find the range of the middle 50% of datapoints within a set. A quartile is a statistical measure that divides a data set into four equal parts, with each part representing 25% of the observations. There are three quartile values: the first quartile (Q1), which marks the 25th percentile; the second quartile (Q2), which is the median; and the third quartile (Q3), which marks the 75th percentile. The **interquartile range** can be defined as Q3-Q1 and can be helpful when analyzing the variability of data and/or identifying outliers.

Read more [here](#).

Pipeline Command

The command can be found in the **Pipeline Workshop** under **Metric** as so:

```
Metric_Interquartile
! /RESULT_METRIC_FOLDER=PROCESSED
/RESULT_METRIC_NAME=
! /APPLY_AS_SUFFIX_TO_SIGNAL_NAME=FALSE
/SIGNAL_TYPES=
! /SIGNAL_FOLDER=ORIGINAL
! /SIGNAL_NAMES=
! /COMPONENT_SEQUENCE=
/EVENT_SEQUENCE=
/EXCLUDE_EVENTS=
! /GENERATE_MEAN_AND_STDDEV=TRUE
! /GENERATE_MEAN_AND_STDDEV_ACROSS_SUBJECTS=FALSE
! /APPEND_TO_EXISTING_VALUES=FALSE
;
```

Command Parameters

The following table shows the command parameters seen above and their descriptions:

RESULT_METRIC_FOLDER	The name of the result signal folder
RESULT_METRIC_NAME	The name of the result signal
APPLY_AS_SUFFIX_TO_SIGNAL_NAME	Specify the metric name to be the ORIGINAL signal plus a SUFFIX
SIGNAL_TYPES	Specify the signal type
SIGNAL_FOLDER	Specify the origin folder
SIGNAL_NAMES	Specify the Signal to be used

COMPONENT_SEQUENCE	Specify the Signal components to be used (e.g. X + Y + Z or 0 + 1 + 2 etc)
EVENT_SEQUENCE	A list of events (separated by "+" signs). For example, LHS+RTO
EXCLUDE_EVENTS	If this event occurs before the first and last event, do not computed a metric
GENERATE_MEAN_AND_STDDEV	Generate the mean and standard deviation of this metric
GENERATE_MEAN_AND_STDDEV_ACROSS_SUBJECTS	Generate the mean and standard deviation of this metric across ranges and files
APPEND_TO_EXISTING_VALUES	Add these metric values to an existing metric

Dialog

The command can be edited in a text editor or in a dialog form. To edit in the dialog pop up form either click on the **Edit** button in the pipeline workshop or double-click on the pipeline command. The dialog is shown below

Metric_Interquartile

Resulting Metric Name

☐ Add as suffix to signal name

Resulting Metric Folder

Signal Component (X,Y,Z,R) or (1,2,...) or ALL

☐ Show signals and events with subject prefixes removed

Defined Events

END

LON

START

>>

<<

Event Sequence

Exclude sequences containing these events

☒ Generate Global Mean and Standard Deviation (_MEAN and _STDDEV)

* Generates the mean of the resulting values (ie; mean would be a mean of the means)

☐ Generate Mean and Standard Deviation Across Subjects

* Generates the mean of the resulting values across Subjects

☐ Append to existing metric values

OK

Cancel

The dialog box allows you to assign values to the command parameters outlined above.

Example: Calculating Joint Work Using Integration

Determining the energy contributions of different joints during locomotion can be integral (no pun intended) to understanding the gait cycle and comparing one trial to another. Some subjects may rely more heavily on ankle propulsion, while others may see more energy production from their knees and hips as a result of factors like age or imbalances.

Here we use **Automatic Gait Events** and **Metric Integrate** to compare the work done by a subject's right and left knees while running on a treadmill.

First, define important gait events using **Automatic Gait Events**.

```
Automatic_Gait_Events
! /FRAME_WINDOW=8
! /USE_TPR=TRUE
! /TPR_EVENT_INSTANCE=1
;
```

Next we will compute the work done by the left and right knees by integrating knee power with respect to time.

```
Metric_Integrate
! /RESULT_METRIC_FOLDER=PROCESSED
/RESULT_METRIC_NAME=R_Knee_Work
! /APPLY_AS_SUFFIX_TO_SIGNAL_NAME=FALSE
/SIGNAL_TYPES=LINK_MODEL_BASED
! /SIGNAL_FOLDER=ORIGINAL
/SIGNAL_NAMES=RKneePower
/COMPONENT_SEQUENCE=X
/EVENT_SEQUENCE=RHS+RTO
/EXCLUDE_EVENTS=
/SEQUENCE_PERCENT_START=
/SEQUENCE_PERCENT_END=
! /GENERATE_MEAN_AND_STDDEV=TRUE
! /GENERATE_MEAN_AND_STDDEV_ACROSS_SUBJECTS=FALSE
! /APPEND_TO_EXISTING_VALUES=FALSE
;
```

```
Metric_Integrate
! /RESULT_METRIC_FOLDER=PROCESSED
/RESULT_METRIC_NAME=L_Knee_Work
! /APPLY_AS_SUFFIX_TO_SIGNAL_NAME=FALSE
/SIGNAL_TYPES=LINK_MODEL_BASED
! /SIGNAL_FOLDER=ORIGINAL
/SIGNAL_NAMES=LKneePower
/COMPONENT_SEQUENCE=X
/EVENT_SEQUENCE=LHS+LTO
/EXCLUDE_EVENTS=
```

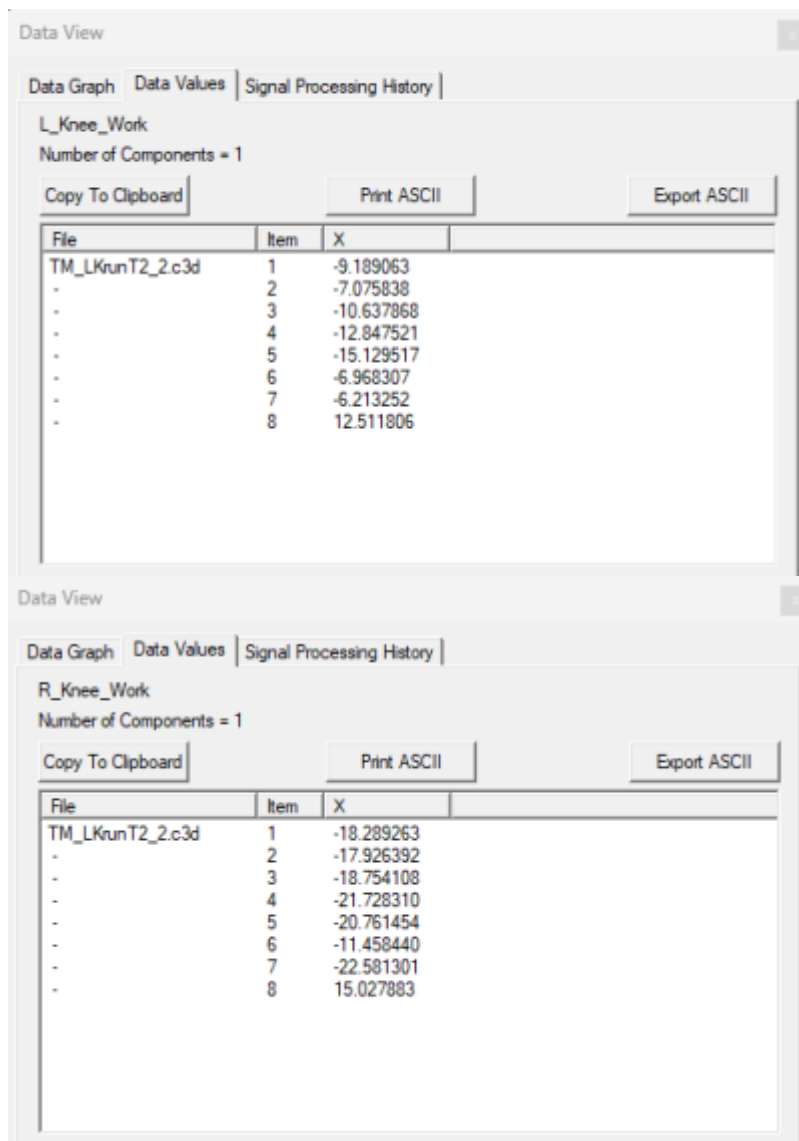
```

/SEQUENCE_PERCENT_START=
/SEQUENCE_PERCENT_END=
! /GENERATE_MEAN_AND_STDDEV=TRUE
! /GENERATE_MEAN_AND_STDDEV_ACROSS_SUBJECTS=FALSE
! /APPEND_TO_EXISTING_VALUES=FALSE
;

```

6 new metrics have now been computed, the work, mean work, and standards deviation of work done for the left and right knees. Comparing the work done in each stride and mean work done for the left and right sides will help to identify any asymmetry between sides.

The results should look something like this:



L_Knee_Work
Number of Components = 1

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File	Item	X
TM_LKrunT2_2.c3d	1	-9.189063
-	2	-7.075838
-	3	-10.637868
-	4	-12.847521
-	5	-15.129517
-	6	-6.968307
-	7	-6.213252
-	8	12.511806

R_Knee_Work
Number of Components = 1

Copy To Clipboard | Print ASCII | Export ASCII

File	Item	X
TM_LKrunT2_2.c3d	1	-18.289263
-	2	-17.926392
-	3	-18.754108
-	4	-21.728310
-	5	-20.761454
-	6	-11.458440
-	7	-22.581301
-	8	15.027883

Data View

Data Graph | Data Values | Signal Processing History

R_Knee_Work_MEAN

Number of Components = 1

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File	Item	X
TM_LKrunT2_2.c3d	1	-14.558923

Complex Examples

- [Impulse](#)
- [Joint_Work](#)

NOTE: When using the Metric_Integrate dialog box, don't forget to Import the desired signals.

From:

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Last update: **2025/10/06 15:06**

