

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

PROCESSED

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

ALL

☐ Show signals and events with subject prefixes removed

Defined Events

END

LON

START

>>

<<

Event Sequence

&u2191

&u2193

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: COFP Range for balance trial

Here the **Metric Interquartile** command is used to analyze center of foot pressure data during a standing trial and compare the ranges computed for a subject's left and right sides.

The command for the right side looks like this:

```
Metric_Interquartile
! /RESULT_METRIC_FOLDER=PROCESSED
/RESULT_METRIC_NAME=COFP_RIGHT_INTER
! /APPLY_AS_SUFFIX_TO_SIGNAL_NAME=FALSE
/SIGNAL_TYPES=COFP
! /SIGNAL_FOLDER=ORIGINAL
/SIGNAL_NAMES=FP3
/COMPONENT_SEQUENCE=ALL
/EVENT_SEQUENCE=START+END
/EXCLUDE_EVENTS=
! /GENERATE_MEAN_AND_STDDEV=TRUE
! /GENERATE_MEAN_AND_STDDEV_ACROSS_SUBJECTS=FALSE
! /APPEND_TO_EXISTING_VALUES=FALSE
;
```

COFP is a 2 dimensional signal, with the X and y components representing the medial/lateral and anterior/posterior directions respectively. The resulting metrics contain an x value and a y value indicating the variation in pressure for each direction during the trial. A larger range indicates greater variation in the COFP value during the trial and a less consistent balance point.

The results for this trial show a larger range for the right side than left and a greater range in the Y direction than X for both sides.

Data View

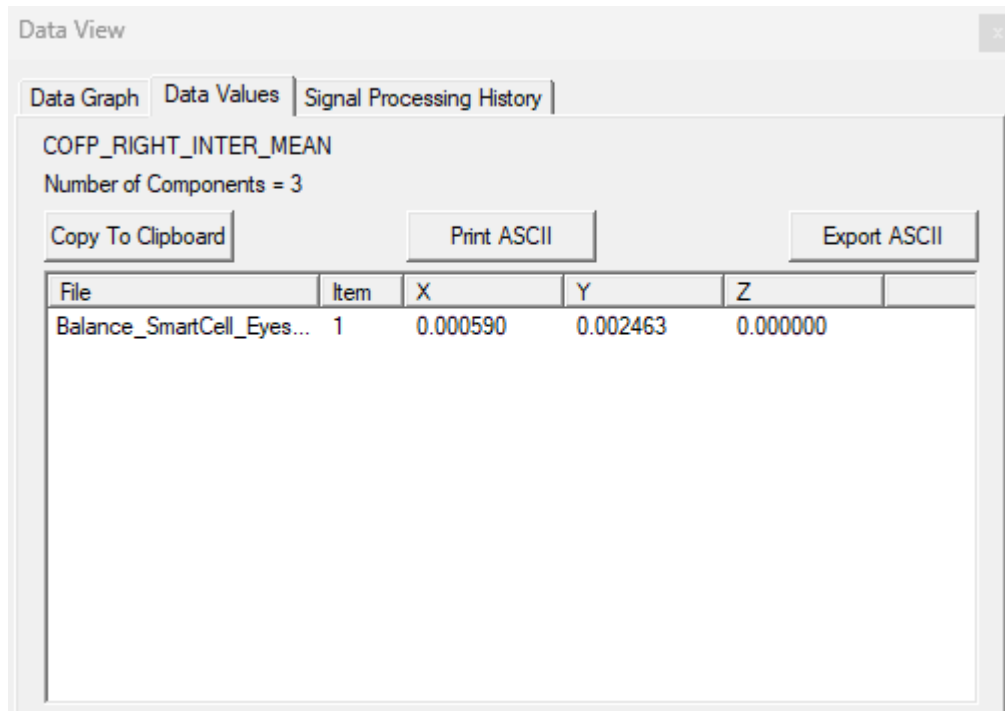
Data Graph | Data Values | Signal Processing History

COFP_LEFT_INTER

Number of Components = 3

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File	Item	X	Y	Z
Balance_SmartCell_Eyes...	1	0.000499	0.001041	0.000000



Data View

Data Graph | Data Values | Signal Processing History

COFP_RIGHT_INTER_MEAN

Number of Components = 3

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File	Item	X	Y	Z
Balance_SmartCell_Eyes...	1	0.000590	0.002463	0.000000

Example: Comparing Interquartile Ranges for joints

In this example **Metric Interquartile** is used to compare the left and right ankle angles of subjects running on a treadmill.

First, **Automatic Gait Events** is used to define key events that will define the following commands:

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

Next, the **Interquartile** command is used to identify the middle 50% range of ankle angle values for both sides between toe and heel strikes.

```
Metric_Interquartile
! /RESULT_METRIC_FOLDER=PROCESSED
/RESULT_METRIC_NAME=RANKLE_INTER
! /APPLY_AS_SUFFIX_TO_SIGNAL_NAME=FALSE
/SIGNAL_TYPES=LINK_MODEL_BASED
! /SIGNAL_FOLDER=ORIGINAL
/SIGNAL_NAMES=RankleAngle
! /COMPONENT_SEQUENCE=
/EVENT_SEQUENCE=RHS+RTO
/EXCLUDE_EVENTS=
! /GENERATE_MEAN_AND_STDDEV=TRUE
! /GENERATE_MEAN_AND_STDDEV_ACROSS_SUBJECTS=FALSE
! /APPEND_TO_EXISTING_VALUES=FALSE
```

```
;
Metric_Interquartile
! /RESULT_METRIC_FOLDER=PROCESSED
/RESULT_METRIC_NAME=LANKLE_INTER
! /APPLY_AS_SUFFIX_TO_SIGNAL_NAME=FALSE
/SIGNAL_TYPES=LINK_MODEL_BASED
! /SIGNAL_FOLDER=ORIGINAL
/SIGNAL_NAMES=LAnkleAngle
! /COMPONENT_SEQUENCE=
/EVENT_SEQUENCE=LHS+LTO
/EXCLUDE_EVENTS=
! /GENERATE_MEAN_AND_STDDEV=TRUE
! /GENERATE_MEAN_AND_STDDEV_ACROSS_SUBJECTS=FALSE
! /APPEND_TO_EXISTING_VALUES=FALSE
;
```

The results for this trial show that the subjects on average exhibited a larger interquartile range for flexion of their left ankles than right.

Data View

Data Graph | Data Values | Signal Processing History

LANKLE_INTER_MEAN

Number of Components = 3

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File	Item	X	Y	Z
TM_LKrunT1_1.c3d	1	13.536566	3.150220	6.048805
TM_LKrunT1_2.c3d	1	13.768261	3.647251	6.798431
TM_LKrunT2_1.c3d	1	13.416288	3.625084	7.807497
TM_LKrunT2_2.c3d	1	13.383019	5.114374	7.043467

Data View

Data GraphData ValuesSignal Processing History

RANKLE_INTER
Number of Components = 3

Copy To Clipboard

Print ASCII

Export ASCII

File	Item	X	Y	Z	
TM_LKrunT1_1.c3d	1	16.222282	3.762858	6.802561	
-	2	16.672367	2.482449	7.398260	
-	3	15.354837	1.372091	7.578070	
-	4	14.345755	3.125567	6.266386	
-	5	16.990944	2.673035	5.303148	
-	6	15.160767	4.553942	7.254177	
-	7	17.260330	1.617535	7.639312	
-	8	16.927704	2.482265	8.345755	
TM_LKrunT1_2.c3d	1	16.096735	3.153077	6.796280	
-	2	15.716413	2.996019	5.988272	
-	3	17.972012	2.541011	7.223139	
-	4	16.052485	2.030401	8.213234	
-	5	17.579281	3.519600	6.207138	
-	6	14.724367	3.552227	11.138718	

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Last update: 2025/10/24 17:48

