
AIMMS Function Reference - Histogram Functions

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Histogram Functions

AIMMS supports the following functions for creating and managing histograms:

- HistogramAddObservation
- HistogramCreate
- HistogramDelete
- HistogramGetAverage
- HistogramGetBounds
- HistogramGetDeviation
- HistogramGetFrequencies
- HistogramGetKurtosis
- HistogramGetObservationCount
- HistogramGetSkewness
- HistogramSetDomain

HistogramAddObservation

The procedure `HistogramAddObservation` adds a new observation to a histogram that was previously created through the procedure `HistogramCreate`.

```
HistogramAddObservation(  
    histogram_id,    ! (input) a scalar parameter  
    value            ! (input) a scalar value  
)
```

Arguments:

histogram_id

A scalar value representing a histogram that was previously created using the `HistogramCreate` procedure.

value

The value of a new observation that should be added to the histogram.

Return value:

The procedure returns 1 if the new observation is added successfully, or 0 otherwise.

See also:

The procedure [HistogramCreate](#). Histogram support in AIMMS is discussed in full detail in [Section 19.3](#) of the User's Guide.

HistogramCreate

The function `HistogramCreate` sets up a new histogram. The created histogram does not yet contain any observations. These observations must be added later using the function `HistogramAddObservation`.

```
HistogramCreate(  
    histogram_id,      ! (output) a scalar parameter  
    [integer_histogram,] ! (optional) 0 or 1  
    [sample_buffer_size] ! (optional) a positive integer value  
)
```

Arguments:

histogram_id

On return, this argument will contain a unique identification number, that is used to refer to the created histogram in other functions.

integer_histogram (optional)

A logical indicator that specifies whether the observations will be integer-valued. Default is 0 (not integer).

sample_buffer_size (optional)

The sample buffer size used in the histogram. If omitted, a default buffer size of 512 is used.

Return value:

The function returns 1 if the histogram is created successfully, or 0 otherwise.

See also:

The functions `HistogramDelete`, `HistogramAddObservation`. Histogram support in AIMMS is discussed in full detail in Section 19.3 of the User's Guide.

HistogramDelete

The procedure `HistogramDelete` deletes a histogram that was created using the `HistogramCreate` procedure. After the histogram has been deleted, the histogram id is no longer valid.

```
HistogramDelete(  
    histogram_id      ! (input) a scalar parameter  
)
```

Arguments:

histogram_id

A scalar value representing a histogram that was previously created using the `HistogramCreate` procedure. When the procedure returns, this *histogram_id* no longer refers to a valid histogram.

Return value:

The procedure returns 1 if the histogram is deleted successfully, or 0 otherwise.

See also:

The procedure `HistogramCreate`. Histogram support in AIMMS is discussed in full detail in Section 19.3 of the User's Guide.

HistogramGetAverage

The function `HistogramGetAverage` returns the arithmetic mean of all observations in a histogram.

```
HistogramGetAverage(  
    histogram_id      ! (input) a scalar number  
)
```

Arguments:

histogram_id
A scalar value representing a histogram that was previously created using the `HistogramCreate` function.

Return value:

The function returns the arithmetic mean of all observations added to the histogram.

See also:

The functions `HistogramCreate`, `HistogramGetObservationCount`, `HistogramGetDeviation`, `HistogramGetSkewness`, `HistogramGetKurtosis`. Histogram support in AIMMS is discussed in full detail in Section [19.3](#) of the User's Guide.

HistogramGetBounds

Through the function `HistogramGetBounds` you can obtain the lower and upper bounds of frequency interval in a histogram.

```
HistogramGetBounds(  
    histogram_id,      ! (input) a scalar number  
    left_bound,       ! (output) a one-dimensional parameter  
    right_bound       ! (output) a one-dimensional parameter  
)
```

Arguments:

histogram_id

A scalar value representing a histogram that was previously created using the `HistogramCreate` function.

left_bound

A one-dimensional identifier that will be filled with the left bound of each interval in the histogram. The cardinality of the domain set should be at least the number of intervals.

right_bound

A one-dimensional identifier that will be filled with the right bound of each interval in the histogram. The cardinality of the domain set should be at least the number of intervals.

Return value:

The function returns 1 if the bounds are retrieved successfully, or 0 otherwise.

See also:

The functions `HistogramCreate`, `HistogramSetDomain`. Histogram support in AIMMS is discussed in full detail in Section 19.3 of the User's Guide.

HistogramGetDeviation

The function `HistogramGetDeviation` returns the standard deviation of all observations in a histogram.

```
HistogramGetDeviation(  
    histogram_id    ! (input) a scalar number  
)
```

Arguments:

histogram_id

A scalar value representing a histogram that was previously created using the `HistogramCreate` function.

Return value:

The function returns the standard deviation of all observations in the histogram.

See also:

The functions [HistogramCreate](#), [HistogramGetObservationCount](#), [HistogramGetAverage](#), [HistogramGetSkewness](#), [HistogramGetKurtosis](#). Histogram support in AIMMS is discussed in full detail in [Section 19.3](#) of the User's Guide.

HistogramGetFrequencies

Through the procedure `HistogramGetFrequencies` you can obtain the observed frequencies for each interval in a histogram.

```
HistogramGetFrequencies(  
    histogram_id,      ! (input) a scalar number  
    frequencies        ! (output) a one-dimensional parameter  
)
```

Arguments:

histogram_id

A scalar value representing a histogram that was previously created using the `HistogramCreate` procedure.

frequencies

A one-dimensional identifier that will be filled with the frequencies of each interval in the histogram. The cardinality of the domain set should be at least the number of intervals.

Return value:

The procedure returns 1 if the frequencies are retrieved successfully, or 0 otherwise.

See also:

The procedures `HistogramCreate`, `HistogramAddObservation`. Histogram support in AIMMS is discussed in full detail in Section 19.3 of the User's Guide.

HistogramGetKurtosis

The function `HistogramGetKurtosis` returns the kurtosis coefficient of all observations in a histogram.

```
HistogramGetKurtosis(  
    histogram_id    ! (input) a scalar number  
)
```

Arguments:

histogram_id

A scalar value representing a histogram that was previously created using the `HistogramCreate` function.

Return value:

The function returns the kurtosis coefficient of all observations in the histogram.

See also:

The functions `HistogramCreate`, `HistogramGetObservationCount`, `HistogramGetAverage`, `HistogramGetDeviation`, `HistogramGetSkewness`. Histogram support in AIMMS is discussed in full detail in Section [19.3](#) of the User's Guide.

HistogramGetObservationCount

The function `HistogramGetObservationCount` returns the total number of observations in a histogram.

```
HistogramGetObservationCount(  
    histogram_id      ! (input) a scalar number  
)
```

Arguments:

histogram_id
A scalar value representing a histogram that was previously created using the `HistogramCreate` function.

Return value:

The function returns the total number of observations in a histogram.

See also:

The functions `HistogramCreate`, `HistogramGetAverage`, `HistogramGetDeviation`, `HistogramGetSkewness`, `HistogramGetKurtosis`. Histogram support in AIMMS is discussed in full detail in Section [19.3](#) of the User's Guide.

HistogramGetSkewness

The function `HistogramGetSkewness` returns the skewness of all observations in a histogram.

```
HistogramGetSkewness(  
    histogram_id    ! (input) a scalar number  
)
```

Arguments:

histogram_id

A scalar value representing a histogram that was previously created using the `HistogramCreate` function.

Return value:

The function returns the skewness of all observations in the histogram.

See also:

The functions [HistogramCreate](#), [HistogramGetObservationCount](#), [HistogramGetAverage](#), [HistogramGetDeviation](#), [HistogramGetKurtosis](#). Histogram support in AIMMS is discussed in full detail in Section [19.3](#) of the User's Guide.

HistogramSetDomain

With the procedure `HistogramSetDomain` you can override the default layout of frequency intervals of a histogram.

```
HistogramSetDomain(
  histogram_id,      ! (input) a scalar number
  intervals,        ! (input) a positive integer number
  [left,]           ! (optional) a scalar expression
  [width,]          ! (optional) a positive scalar number
  [left_tail,]      ! (optional) 0 or 1
  [right_tail]      ! (optional) 0 or 1
)
```

Arguments:

histogram_id

A scalar value representing a histogram that was previously created using the `HistogramCreate` procedure.

intervals

The number of fixed-width intervals (not including the `left_` or `right_tail` interval).

left (optional)

The lower bound of the left-most interval (not including the left-tail interval). If omitted, then the histogram will use the observations to determine this bound.

width (optional)

The (fixed) width of each interval. If omitted, then the histogram will use the observations to determine the width.

left_tail (optional)

An indicator whether or not a left-tail interval should be created. If this argument is omitted, then the default value of 1 is used (creating a left-tail interval).

right_tail (optional)

An indicator whether or not a right-tail interval should be created. If this argument is omitted, then the default value of 1 is used (creating a right-tail interval).

Return value:

The procedure returns 1 if the domain is changed successfully, or 0 otherwise.

See also:

The procedures `HistogramCreate`, `HistogramGetBounds`. Histogram support in AIMMS is discussed in full detail in Section 19.3 of the User's Guide.