Chapter 1
What’s New in SAS High-Performance Forecasting 3.1

Overview

SAS High-Performance Forecasting has implemented a new release numbering scheme. Both SAS High-Performance Forecasting 2.3 and SAS High-Performance Forecasting 3.1 have been released since SAS 9.1.3. Each release provides new features while maintaining all the capabilities of previous releases.

In SAS High-Performance Forecasting 3.1, new features have been added to the following procedures:

- HPFDIAGNOSE procedure enhancements enable you to better control model generation.
- HPFRECONCILE procedure enhancements enable you to better reconcile forecast generation.

In SAS High-Performance Forecasting 2.3, new features were added to the following procedures:

- HPF procedure enhancements provide statistics of fit that are related to scaled and relative errors and enable you to specify an output data set.
- HPFDIAGNOSE procedure enhancements enable you to better control model generation.
- HPFENGINE procedure enhancements provide statistics of fit that are related to scaled and relative errors and enable you to specify an output data set.
- HPFEVENTS procedure enhancements add new predefined date keywords.
- HPFRECONCILE procedure enhancements enable you to better reconcile forecast generation.

HPF Procedure Enhancements

New features related to the forecast model selection enable you to better monitor forecast generation.
SAS High-Performance Forecasting 2.3 introduced the following new features:

- The OUTPROCINFO= option specifies the output data set to contain the summary information of the processing done by HPF Procedure. This option is particularly useful for easy programmatic assessment of the status of the procedure’s execution via a data set instead of looking at or parsing the SAS log.
- statistics of fit related to scaled and relative errors.

**HPFDIAGNOSE Procedure Enhancements**

New features have been added to each release to enable you to better control model generation.

SAS High-Performance Forecasting 2.3 introduced the following new features:

- The DELAYEVENT= option specifies the delay lag for the events. If the option is not specified, the delay lag for the events is set to zero by default.
- The DELAYINPUT= option specifies the delay lag for the inputs. If the option is not specified, the delay lag for the inputs is chosen appropriately by the procedure.
- The ENTRYPCT= option specifies a threshold to check the percentage increment of the criterion between two candidate models. The ENTRYPCT=value should be in the range (0,100); the default is ENTRYPCT=0.1 (0.1%).
- The NODIAGNOSE option specifies that the series is not to be diagnosed. If the INSELECT-NAME= option and OUTEST= option are specified, the existing model specification files are written to the OUTEST data set.
- The OUTPROCINFO= option specifies the output data set to contain the summary information of the processing done by the HPFDIAGNOSE procedure. This option is particularly useful for easy programmatic assessment of the status of the procedure’s execution via a data set instead of looking at or parsing the SAS log.
- The OUTLIER=(ENTRYPCT= ) option specifies a threshold to check the percentage increment between two candidate models. The ENTRYPCT=value should be in the range (0,100); the default is ENTRYPCT=0.1 (0.1%). The value of the OUTLIER=(ENTRYPCT= ) option overrides the value of the ENTRYPCT= option in the HPFDIAGNOSE statement.
- The REFINEPARMS= option specifies that insignificant parameters of the final model are to be refined, identifies the factors to refine, and identifies the order of factors.
- The RETAINCHOOSE option specifies that the PROC HPFSELECT CHOOSE= option is respected when re-diagnosing series.
The POSITIVE or NEGATIVE option is specified in the INPUT statement followed by the REQUIRED= option such as REQUIRED=YES(POSITIVE) and REQUIRED=MAYBE(NEGATIVE). When the REQUIRED=YES(POSITIVE) option is specified, if its coefficient is negative, then the input variable drops out from the model.

SAS High-Performance Forecasting 3.1 introduces the following new features:

- The NOINT option in the ARIMAX statement suppresses the intercept (constant) term in the ARIMA model.
- The INPUTMISSINGPCT option in the PROC HPFDIAGNOSE statement specifies the size of the missing observation as a percentage of the length of the input time series.
- The TYPE=TLS option in the OUTLIER option specifies temporary level shift outliers in the ARIMA model.
- The RETAINCHOOSE=YES|NO option in the PROC HPFDIAGNOSE statement specifies that the CHOOSE= option in the HPFSELECT procedure be respected when rediagnosing series.

HPFENGINE Procedure Enhancements

New features related to the forecasting engine enable you to better monitor forecast generation.

SAS High-Performance Forecasting 2.3 introduced the following new features:

- The OUTPROCINFO= option specifies the output data set to contain the summary information of the processing done by the HPFENGINE procedure. This option is particularly useful for easy programmatic assessment of the status of the procedure’s execution via a data set instead of looking at or parsing the SAS log.
- statistics of fit related to scaled and relative errors.
HPFEVENTS Procedure Enhancements

SAS High-Performance Forecasting 2.3 added new predefined date keywords to the HPFEVENTS procedure:

Table 1.1  New Holiday Date Keywords and Definitions

<table>
<thead>
<tr>
<th>Date Keyword</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLUMBUS</td>
<td>2nd Monday in October</td>
</tr>
<tr>
<td>MLK</td>
<td>3rd Monday in January</td>
</tr>
<tr>
<td>USPRESIDENTS</td>
<td>3rd Monday in February (since 1971)</td>
</tr>
<tr>
<td>VETERANS</td>
<td>November 11</td>
</tr>
<tr>
<td>VETERANSUSG</td>
<td>date observed by U.S. government for Monday-Friday schedule</td>
</tr>
<tr>
<td>VETERANSUSPS</td>
<td>date observed by U.S. government for Monday-Saturday schedule (U.S. Post Office)</td>
</tr>
</tbody>
</table>

HPFRECONCILE Procedure Enhancements

New options have been added in each release.

SAS High-Performance Forecasting 2.3 introduced the following new options:

- The **FORCECONSTRAINT** option specifies whether the user-specified constraints should be forced on the PREDICT variable in the OUTFOR= data set when the problem is infeasible because the constraints are incompatible with the aggregation constraint. The default is to leave the input unmodified.

- The **OUTPROCINFO=** SAS-data-set specifies the output data set to contain the summary information of the processing done by PROC HPFRECONCILE. This option is particularly useful for easy programmatic assessment of the status of the procedure’s execution via a data set instead of looking at or parsing the SAS log.

- The **WEIGHTED** option specifies that the loss function for top-down reconciliation be weighted by the inverse of the variance of the input forecasts.

- The **OUTINFEASIBLE=** data set specifies the output data set that contains summary information.

- The **ALIGN=** option controls the alignment of SAS dates used to identify output observations. Internal processing uses aligned versions of the values of START= and END= options (if specified) and values of ID variable in input observations. The ALIGN= option accepts the following values: BEGIN, MIDDLE, and END. BEGIN is the default.
SAS High-Performance Forecasting 3.1 introduces the following new options:

- The **IGNOREMISSF** option in the PROC HPFRECONCILE statement specifies that '.F' missing values in the PREDICT variable be treated as regular '.' missing values. If the IGNOREMISSF option is not specified, a '.F' missing value is interpreted as a failed forecast, and PROC HPFRECONCILE generates '.F' missing values for all forecasting variables in the OUTFOR= data set if that value is needed for computing the reconciled forecasts. If the IGNOREMISSF option is specified, observations that correspond to '.F' missing values are considered to belong to inactive series and therefore are not included in the reconciliation process.

- The **LOCKZERO** option in the PROC HPFRECONCILE statement specifies that zero values of the PREDICT variable in the DISAGGDATA= data be considered locked equalities. This option is available only when DIRECTION=TD. When the LOCKZERO option is active, a zero value for PREDICT in the DISAGGDATA= set implies a zero value for the corresponding observation in the OUTFOR= data set. However, if constraints are specified in the CONSTRAINT= data set for that observation, these constraints have precedence over the LOCKZERO option. Note that an unlocked equality constraint in the CONSTRAINT= data also has precedence over the LOCKZERO option. Similarly, an unlocked equality whose value is zero is not converted to a locked equality, even though the LOCKZERO option is specified.

- The **MAXITER=** option in the PROC HPFRECONCILE statement specifies the maximum number of predictor-corrector iterations performed by the interior point algorithm. The value \( k \) is an integer between 1 and the largest four-byte, signed integer, \( 2^{31} - 1 \). The default value is MAXITER=100.

- The **BYV ARSSORTED** option in the DISAGGDATA statement specifies that the DISAGGDATA= data set be sorted by the BY variables. This option improves input/output performance when there is an index defined on the BY variables. Use of an index degrades the performance as compared to processing a sorted data set. If the BYV ARSSORTED option is not specified, PROC HPFRECONCILE uses only the index for processing and disregards the sorting order. If you specify the BYV ARSSORTED option in the DISAGGDATA statement, PROC HPFRECONCILE exploits the sorting order to achieve better performance and uses the index minimally.