Running X-13ARIMA-SEATS **on a single series:**

{*path1*\}x13as {-i} {*path2*\}filename

where:

{*-i*} :	optional flag that informs X-13ARIMA-SEATS that the named file is an input specification file
{*path2*\} filename.spc :	input specification file
{*path2*\} filename.out :	main output file
{*path2*\} filename.err :	error file
{*path2*\} filename.log :	log file, which gives a summary of user-selected diagnostics
{*path1*\} :	path information for the X-13ARIMA-SEATS program (optional)
{*path2*\} :	path information for the X-13ARIMA-SEATS input file (optional)

Example:

```
/vol/x13as/x13as /vol/sales/retail
```

Notes:

(a)   Only the filename (and path, if necessary) is specified, not the extension.
(b)   The program uses this filename to form the filename of other files generated by the program.

Running X-13ARIMA-SEATS **on a single series with an alternate output name:**

{*path1*\}x13as {-i} {*path2*\}filename1 {-o} {*path3*\}filename2

where:

{*-i*} :	optional flag that informs X-13ARIMA-SEATS that the named file is an input specification file
{*path2*\} filename1.spc :	input specification file
{*-o*} :	optional flag that informs X-13ARIMA-SEATS that the named file is to be used to form the output files
{*path3*\} filename2.out :	main output file
{*path3*\} filename2.err :	error file
{*path3*\} filename2.log :	log file, which gives a summary of user-selected diagnostics
{*path1*\} :	path information for the X-13ARIMA-SEATS program (optional)
{*path2*\} :	path information for the X-13ARIMA-SEATS input file (optional)
{*path3*\} :	path information for the X-13ARIMA-SEATS output file (optional)

Example:

```
/vol/x13as/x13as /vol/sales/retail /vol/sales/retail2
```

Notes:

(a)   Only the filename (and path, if necessary) is specified, not the extension.
(b)   The program uses the alternate filename to form the filename of other files generated by the program.

Handling spaces in file names for a single series:

{*path1*\}x13as {-i} ¨{*path2*\}filename¨

where:

  {*path2*\} filename.spc :   input specification file, enclosed in quotation marks (")
               {*path1*\} :   path information for the X-13ARIMA-SEATS program (optional)
               {*path2*\} :   path information for the X-13ARIMA-SEATS input file (optional)

Example:

                    /vol/x13as/x13as "/vol/US sales/NE retail"

Notes:

  (a)   The opening and closing quotation marks must fully contain the filenames with no extra
         spaces, and there must be matching opening and closing quotation marks for each file.
  (b)   Quotation marks can be used to handle spaces in the alternate output filename as well.
  (c)   Spaces are not allowed before the file extension (`.spc`, `.mta`, etc.)

Running X-13ARIMA-SEATS on more than one series (a spec file for every series):

{*path1*\}x13as -m {*path2*\}metafile

where:

                        -m :   flag that informs X-13ARIMA-SEATS that the named file is a metafile
  {*path2*\} metafile.mta :   input metafile
  {*path2*\} metafile.log :   log file, which gives a summary of all the runs for a given metafile
               {*path1*\} :   path information for the X-13ARIMA-SEATS program (optional)
               {*path2*\} :   path information for the X-13ARIMA-SEATS metafile (optional)

Example:

                    /vol/x13as/x13as -m /vol/sales/allsales

Notes:

  (a)   Only the filename (and path, if necessary) for the metafile is specified, not the extension
  (b)   The metafile must have one or two filenames (without extension) per line, separated by a tab
         or blank spaces. The first filename is the filename of an input specification file. The second (if
         specified) is the filename used to form the filenames of the output files for the run specified by
         the corresponding input selection file.
  (c)   If only one filename is given on a particular line, the filename of the input specification file is
         used to generate the names of the output files.
  (d)   Up to 10000 input files can be specified in a single metafile.

Running `X-13ARIMA-SEATS` on more than one series (one spec file run on many series):

{*path1*\}x13as {*-i*} {*path2*\}filename -d {*path3*\}metafile

where:

{*-i*} :	optional flag that informs `X-13ARIMA-SEATS` that the named file is an input specification file
{*path2*\} filename.spc :	input specification file
-d :	the flag that informs `X-13ARIMA-SEATS` that the named file is a data metafile
{*path3*\} metafile.dta :	data metafile
{*path3*\} metafile.log :	log file, which gives the summary of all the runs for a given metafile
{*path1*\} :	path information for the `X-13ARIMA-SEATS` program (optional)
{*path2*\} :	path information for the `X-13ARIMA-SEATS` input file (optional)
{*path3*\} :	path information for the `X-13ARIMA-SEATS` data metafile (optional)

Example:

```
/vol/x13as/x13as sales -d /vol/sales/alldata
```

Notes:

(a)   Only the filename (and path, if necessary) for the data metafile is specified, not the extension.

(b)   The metafile must have one or two filenames per line, separated by a tab or blank spaces. The first filename is the name of a data file (including the file extension). The second (if specified) is the filename (without extension) used to form the filenames of the output files for the run specified by the corresponding input specification file.

(c)   If only one filename is given on a particular line, the filename of the data file is used to generate the names of the output files.

(d)   The `X-13ARIMA-SEATS` options given in the input specification file are applied to the data read in from each of the files given in the data metafile.

(e)   Up to 10000 data files can be specified in a single data metafile.

Handling spaces in file names for a metafile run

{*path1*\}x13as -m " {*path2*\} metafile "

where:

-m :	flag that informs `X-13ARIMA-SEATS` that the named file is a metafile
{*path2*\} metafile.mta :	input metafile, enclosed in quotation marks (")
{*path1*\} :	path information for the `X-13ARIMA-SEATS` program (optional)
{*path2*\} :	path information for the `X-13ARIMA-SEATS` metafile (optional)

Examples:

```
/vol/x13as/x13as -m "/vol/US sales/all sales"
```
```
/vol/x13as/x13as "airline model" -d "/vol/US sales/all sales data"
```

Notes:

(a)   Filenames within the metafile or data metafile can also be surrounded by quotes if they have spaces embedded in the name of the file.

(b)   The opening and closing quotation marks must fully contain the filenames with no extra spaces, and there must be matching opening and closing quotation marks for each file.

(c)   Spaces are not allowed before the file extension (`.spc`, `.mta`, etc.)

(d)   All other rules for constructing and running metafiles are the same.

Other options declared at time of execution:

-c :	Suppress the indirect adjustment in a composite adjustment.
-g dirname :	Store graphics metafile and related files for external graphics in the *dirname* directory.
-n :	(No tables) Print only the tables specifically requested in the input specification file.
-p :	Turn off pagination in the main output file.
-q :	Run X-13ARIMA-SEATS in "quiet" mode (warning messages not sent to console).
-r :	Use reduced output format for table formats and headers.
-s :	Store seasonal adjustment and regARIMA model diagnostics in a file.
-t :	Store timing information in the diagnostics file (if -s or -g not specified, will generate diagnostic file)
-v :	Check input specification file(s) for errors only; no other processing.
-w :	Use wide (132 character) format in main output file.

Examples:

```
/vol/x13as/x13as -i /vol/trade/imports -o /vol/trade/importsRun2 -s

/vol/x13as/x13as /vol/trade/imports /vol/trade/importsRun2 -s

/vol/x13as/x13as -m "/vol/EU trade/all exports" -g "/vol/EU trade/graph" -q -r
```

Notes:

(a) The first two examples are equivalent; when the input specification file is given as the first argument, the -i flag is assumed. When the alternate output filename is given as the second argument, the -o flag is assumed.

(b) Options can entered in any order (ie, -n -s is treated the same as -s -n).

(c) The -v flag should not be used with the -s, -c, -n, -w, -r, -q or -p flags. A warning message will be generated.

(d) The -c flag can only be used with the -m flag.

(e) The -m flag cannot be used with the -d flag.

(f) The -i flag cannot be used with the -m flag.

(g) The -o flag cannot be used with the -m and -d flags.

(h) Quotation marks can be used for all filenames that have spaces.

Specs and arguments for the input specification file

Notes:

(a) Every input specification file must have either a **series** spec or a **composite** (for runs where a composite seasonal adjustment is performed) spec.

(b) The first spec in any input specification file must be either a **series**, **composite**, or **metadata** spec. If the **metadata** spec is the first spec in the input specification file, then the second spec must be either the **series** or **composite** spec.

(c) The **series** and **composite** specs cannot be used in the same input file.

(d) For the arguments given below, when two or more values are connected by the symbol |, only one of the values can be assigned to the argument in a given run.

(e) Dates are specified as either *year.month* for monthly data or *year.quarter* for quarterly data. For monthly series, the months can be denoted either by integers (1 to 12) or by month abbreviations (`jan, feb, mar, apr, may, jun, jul, aug, sep, oct, nov, dec`). For quarterly series, only integers (1 to 4) are allowed. A zero can be placed in front of integers from 1 to 9 for padding (for example, `2002.02` is an acceptable date specification for February 2002).

(f) Anything on a line after a number sign (#) is considered a comment and is ignored by the program.

(g) Spec names, arguments, keywords, and dates are not case sensitive. For example, `SeasonalMA` and `seasonalma` are treated the same.

(h) Multiple arguments must be enclosed in parentheses. If an argument accepts multiple values but only one is given, then the parentheses are optional. If an argument accepts only a single value, the value must not be enclosed in parentheses.

(i) Either double or single quotation marks are acceptable for character arguments.

(j)   The **data** and **file** arguments cannot be used in the same spec.

(k)   The **data** and **format** arguments cannot be used in the same spec.

(l)   Only one of the **automdl**, **pickmdl** and **arima** specs can be used in the same input file.

(m)   The **x11** and **seats** specs cannot be used in the same input file, and the **x11regression** spec cannot be used in conjunction with the **seats** spec.

(n)   Change of regime regression variables can be specified for seasonal (`seasonal`), trigonometric seasonal (`sincos`), trading day (`td, tdnolpyear, td1coef, td1nolpyear, tdstock, or tdstock1coef`), length-of-month (`lom`), length-of-quarter (`loq`), or leap year (`lpyear`) regression variables. When a change of regime is specified for one of these regression variables, the program will add an additional set of regression variables that is defined as usual before the date of the change of regime, and set to zero for those observations on or after the change of regime date. A change of regime regression variable is specified by appending a valid date surrounded by slashes to the name of a regression variable in the **variables** argument of the **regression** spec. For example, to specify a change of regime in trading day starting June of 1985, put `td/1985.jun/` in the **variables** argument of the **regression** spec.

(o)   `X-13ARIMA-SEATS` will extend the series with one year of forecasts prior to `X-11` seasonal adjustment and three years of forecasts prior to a SEATS seasonal adjustment whenever a regARIMA model is specified with no **forecast** spec. The only way to specify a seasonal adjustment without forecast extension when a regARIMA model is specified is to set `maxlead = 0` in the **forecast** spec.

(p)   The **function** and **power** arguments cannot be used together in the **transform** spec.

(q)   The **x11regression** spec cannot be used for a series with missing data.

(r)   When `0.per` is entered for the ending date of the **modelspan** argument of the **series** or **composite** specs, the ending date of the model span will be set to be the final occurrence of the period `per` in the span of data analyzed (ie, `modelspan = (1980.jan,0.dec)` will set the ending date of the model span to the last December of the data).

(s)   The **diff** and **maxdiff** arguments in the **automdl** specs cannot be used in the same input file; if they are found in the same file, only the values of **maxdiff** will be used.

(t)   The **period** argument of the **series** and **composite** specs can be any number up through 12, but only certain values (1, 2, 4, 6, and 12 for SEATS, 12 and 4 for `X-11`) are allowed when performing a seasonal adjustment of the series.

(u)   Setting `out = 2` in the **seats** reduces the number of series that can be saved by the **save** argument.

(v)   Arguments which have been designated **Rarely Used Arguments** in the main documentation are given at the end of each spec, with a "#" as the first character of the line.

INDIVIDUAL SPECS (with starting page number in main documentation)

INDIVIDUAL SPECS

```
arima{
    ar = (initial coefficients for AR, or fixed values with suffix f, e.g. -.6f)
    ma = (initial coefficients for MA, or fixed values with suffix f, e.g. -.6f)
    model = (p d q)(P D Q)
    title = "     "
}

automdl{
    acceptdefault = yes | no { default : no }
    checkmu = yes | no { default : yes }
    diff = (regular differencing order, seasonal differencing order)
    ljungboxlimit = number { default : 0.95 }
    maxdiff = (maximum regular differencing order, maximum seasonal differencing order) { default: (2,1) }
    maxorder = (maximum nonseasonal ARMA order, maximum seasonal ARMA order) { default: (2,1) }
    mixed = yes | no { default : yes }
    print = See Table 1 for list of table names
    savelog = See Table 2 for list of diagnostics
    seasonaloverdiff = yes | no { default : no }
#    armalimit = limit for t-statistics of ARMA coefficients { default : 1.0 }
#    balanced = yes | no { default : no }
#    exactdiff = yes | no | first { default : first }
#    fcstlim = limit for average forecast error { default: 15.0 }
#    hrinitial = yes | no { default : no }
#    reducecv = amount of reduction for outlier critical value { default : 0.14286 }
#    rejectfcst = yes | no { default : no }
#    urfinal = limit for the final unit root test { default : 1.05 }
}
```

check{
   maxlag = number of acf's to print
      { default: 24 for monthly series, 8 for quarterly series }
   print = See Table 1 for list of table names
   qtype = ljungbox | lb | boxpierce | bp { default : ljungbox }
   save = See Table 1 for list of table names
   savelog = See Table 2 for list of diagnostics
\#   acflimit = limit for acf/se(acf) in diagnostic output { default: 1.6 }
\#   qlimit = limit for Box-Ljung and Box-Pierce Q statistic in diagnostic output { default: 0.05 }
}

composite{
   appendbcst = yes | no { default: no }
   appendfcst = yes | no { default: no }
   decimals = 0 number of output decimals, must be an integer from 0 to 5, inclusive
   modelspan = (*startdate, enddate*)
      { default: starting, ending date of the aggregated series }
   name = "   "
   print = See Table 1 for list of table names
   save = See Table 1 for list of table names, and
      Table 3 for a list of tables that can be saved as percentages
   savelog = See Table 2 for list of diagnostics
   title = "   "
   type = flow | stock { default: series does not have a specific type }
\#   indoutlier = yes | no { default: yes }
\#   saveprecision = 15 { default: 15 (number of decimals in save tables) }
\#   yr2000 = yes | no { default: yes }
}

estimate{
   exact = ma | arma | none { default: arma (exact m.l.e. for all coefficients) }
   maxiter = maximum number of iterations { default: 1500 }
   outofsample = yes | no { default: no }
   print = See Table 1 for list of table names
   save = See Table 1 for list of table names
   savelog = See Table 2 for list of diagnostics
   tol = convergence tolerance { default: 1.0e-5 }
\#   file = "   "
\#   fix = nochange | all | arima | reg | none { default: nochange }
\#   parms = fixed | estimated { default: estimated }
}

force{
   lambda = Value of the parameter $\boldsymbol{\lambda}$ used to determine the weight matrix C for the regression method
      of forcing the totals of the seasonally adjusted series { $-3.0 \leq \boldsymbol{\lambda} \leq 3$, default: 0.0 }
   mode = ratio | diff { default: ratio }
   print = See Table 1 for list of table names
   rho = Value of the AR(1) parameter ($\boldsymbol{\rho}$) used in the regression method { $0.0 \leq \boldsymbol{\rho} \leq 1.0$,
      { default: $0.9^{12/\text{period}}$ (where period is 12 for monthly series, 4 for quarterly) }
   round = yes | no { default: no }
   save = See Table 1 for list of table names, and
      Table 3 for a list of tables that can be saved as percentages
   start = month or quarter when forcing starts { default: 1st month or quarter }
   target = original | calendaradj | permprioradj | both { default: original }
   type = none | denton | regress { default: none }
   usefcst = yes | no { default: yes }
\#   indforce = yes | no { default: yes }
}

forecast{
   exclude = number of observations to drop before starting forecasts { default: 0 }
   lognormal = yes | no { default: no }
   maxback = how many backcasts { default: 0 }
   maxlead = how many forecasts { default: one year, or three years if a SEATS adjustment is specified }
   print = See Table 1 for list of table names
   probability = coverage probability of prediction intervals, assuming normality { default: 0.95 }
   save = See Table 1 for list of table names
}

history{
   endtable = ending date of tables for seasonal adjustment revisions histories
   estimates = (sadj   sadjchng   trend   trendchng   seasonal   aic   fcst   arma   td)
   fixmdl = yes | no { default: no (model is re-estimated every time) }
   fixreg = (td   holiday   user   outlier)
   fstep = vector of forecast leads for the out-of-sample forecasts and MSE's { default: (1,period) }
   print = See Table 1 for list of table names
   sadjlags = vector of (up to 5) target lags for revisions history of the seasonally adjusted series
   save = See Table 1 for list of table names
   savelog = See Table 2 for list of diagnostics
   start = starting date of revision history
   target = concurrent | final { default: final }
   trendlags = vector of (up to 5) target lags for revisions history of the trend component
#   fixx11reg = yes | no { default: no }
#   outlier = (keep | remove   auto) { default: keep }
#   outlierwin = number of observations to test for outliers { default: one year }
#   refresh = yes | no { default: no }
#   transformfcst = yes | no { default: no }
#   x11outlier = yes | no { default: yes }
}

identify{
   diff = (orders of nonseasonal differencing) { default: (0) }
   maxlag = number of acf's and pacf's to print { default: 36 for monthly series, 12 for quarterly series }
   print = See Table 1 for list of table names
   save = See Table 1 for list of table names
   sdiff = (orders of seasonal differencing) { default: (0) }
}

metadata{
   keys = (keys for user-defined metadata)
   values = (corresponding values for user-defined metadata)
}

outlier{
   critical = critical value for outlier testing | $(critical_{AO}, critical_{LS}, critical_{TC})$ { default: Table 4 }
   lsrun = number of successive level shifts to test for cancellation { must be ≤ 7, default: 0 }
   method = addone | addall { default: addone }
   print = See Table 1 for list of table names
   save = See Table 1 for list of table names
   savelog = See Table 2 for list of diagnostics
   span = (*startdate, enddate*)
   types = none | ao | ls | tc | all { default: (ao ls) }
#   almost = number greater than zero used to set threshold for almost outliers { default: 0.5 }
#   tcrate = number between 0 and 1 { default: $0.70^{(12/\text{period})}$, no default if period < 4 }
}

pickmdl {
   bcstlim = limit for average backcast error { default: 20.0 }
   fcstlim = limit for average forecast error { default: 15.0 }
   file = "   " { no default – file must be specified }
   identify = all | first { default: first }
   method = first | best { default: first }
   mode = both | fcst { default: fcst }
   outofsample = yes | no { default: no }
   overdiff = limit for overdifferencing { default: 0.9 }
   print = See Table 1 for list of table names
   qlim = limit for probability of Ljung-Box Q { default: 5.0 }
   savelog = See Table 2 for list of diagnostics
}

regression{
   aicdiff = difference needed for AIC-based test to accept regressor { default: 0.0 }
   aictest = (td | tdnolpyear | td1coef | td1nolpyear | tdstock | tdstock1coef   lpyear | loq | lom
      easter | easterstock   user)
   chi2test = yes | no { default: no }
   chi2testcv = critical value probability for chi2test { must be > 0.0 and < 1.0, default: 0.01 }
   file = "   "   **OR**   data = ( )
   format = "(*valid FORTRAN format*)" | "datevalue" | "datevaluecomma" | "free" |
      "freecomma" | "x12save" | "x13save" { default: "free" }
   print = See Table 1 for list of table names
   pvaictest = critical value probability for AIC test { must be > 0.0 and < 1.0,
      { default: use `aicdiff` to set critical value for AIC testing }
   save = See Table 1 for list of table names
   savelog = See Table 2 for list of diagnostics
   start = *date* { default: the beginning of the series }
   testalleaster = yes | no { default: no }
   tlimit = Critical value of *t*-statistic for AO or LS sequence regressors
      { default: AO or LS regressors in sequence not checked for significance }
   user = (names of user-defined regression variable(s))
   usertype = (constant   seasonal   td   lpyear   lom   loq   user
      ao   ls   so   holiday   holiday2   holiday3   holiday4   holiday5)
   variables = (const   seasonal | sincos[1 to period/2]
      ao*date*   ls*date*   tc*date*   so*date*   aos*date-date*   lss*date-date*
       rp*date-date*   tl*date-date*   qi*date-date*   qd*date-date*
      td | tdnolpyear | td1coef | td1nolpyear | tdstock[1 to 31] | tdstock1coef[1 to 31]   lpyear | loq | lom
      easter[0 to 25] | easterstock[1 to 25] | sceaster[1 to 24]   labor[1 to 25]   thank[-8 to 17])
\#   b = (fixed values for regression coefficients if specified with suffix f, e.g. -.6f; values specified without a
\#   suffix f are ignored and these coefficients are estimated by GLS)
\#   centeruser = mean | seasonal { default: user-defined regressors are not centered }
\#   eastermeans = yes | no { default: yes }
\#   noapply = (td   ao   ls   tc   so holiday   userseasonal   user)
\#   tcrate = number between 0 and 1 { default: $0.70^{(12/\mathrm{period})}$, no default if period < 4 }
\#   trendtc = yes | no { default: no }
}

seats{
   appendfcst = yes | no { default: no }
   finite = yes | no { default: no }
   hpcycle = yes | no { default: yes }
   hplan = parameter used to compute the modified Hodrick-Prescott filter
   hprmls = yes | no { default: no }
   hptarget = orig | sadj | trend { default: trend }
   noadmiss = yes | no { default: no }
   out = 0 | 1 | 2 { default: 0 }
   print = See Table 1 for list of table names
   printphtrf = 0 | 1 { default: 0 }
   qmax = limit for the Ljung-Box Q statistic { default: 50 }
   save = See Table 1 for list of table names; Table 3 for tables that can be saved as percentages;
      Table 7 for tables that can only be saved; and Table 5 for output from the original SEATS program.
   savelog = See Table 2 for list of diagnostics
   statseas = yes | no { default: yes }
   tabtables = Character string with components to save – see Table 6 for list of components
\#   bias = -1 | 0 | 1 { default: 1 }
\#   epsiv = Convergence criteria for ARIMA estimation within the SEATS module { default: 0.001 }
\#   epsphi = allocated $\phi(\boldsymbol{B})$ to the seasonal if its frequency differs from the seasonal frequencies
\#   by less than epsphi degrees { default: 2 }
\#   imean = yes | no { default: no }
\#   maxit = Number of iterations allowed for ARIMA estimation within SEATS module { default: 20 }
\#   rmod = limit for the modulus of an AR root. { default: 0.80 }
\#   xl = limit for AR modulus test. { default: 0.99 }
}

series{
   appendbcst = yes | no { default: no }
   appendfcst = yes | no { default: no }
   comptype = none | add | sub | mult | div { default: none }
   compwt = any number >0 { default: 1 }
   decimals = 0 { number of output decimals, must be an integer from 0 to 5, inclusive }
   file = "   "   **OR**   data = ( )
   format = "(*valid FORTRAN format*)" | "1r" | "2r" | "1l" | "2l" | "2l2" | "cs" | "cs2" | "free" |
     "freecomma" | "datevalue" | "datevaluecomma" | "tramo" | "x12save" | "x13save" { default: "free" }
   modelspan = (*startdate, enddate*) { default: starting, ending date of span }
   name = "   "
   period = 12 | 4 | (SEATS adjustments only: 6 | 2 | 1) { default: 12 }
   precision = 0 { number of input decimals, must be an integer from 0 to 5, inclusive }
   print = See Table 1 for list of table names
   save = See Table 1 for list of table names
   span = (*startdate, enddate*)
   start = *date*
   title = "   " { default: "X-13A-S run for *name*" }
   type = flow | stock { default: series does not have a specific type }
\#   divpower = 4 { rescale series by power of 10, must be integer from -9 to 9 }
\#   missingcode = any number { default: -99999. }
\#   missingval = any number { default: 1000000000. }
\#   saveprecision = 10 { default: 15 (number of decimals in save tables }
\#   trimzero = yes | no | span { default: yes }
\#   yr2000 = yes | no { default: yes }
}

slidingspans{
   cutchng = any number >0 { default: 3.0 }
   cutseas = any number >0 { default: 3.0 }
   cuttd = any number >0 { default: 2.0 }
   fixmdl = yes | no | clear { default: yes (model is fixed every span) }
   fixreg = (td   holiday   user   outlier)
   length = length of sliding span { default: selected by program }
   numspans = number of sliding spans (between 2 and 4, inclusive) { default: selected by program }
   outlier = yes | keep | remove { default: keep }
   print = See Table 1 for list of table names
   save = See Table 1 for list of table names
   savelog = See Table 2 for list of diagnostics
   start = starting date of sliding spans comparisons { default: selected by program }
#   additivesa = percent | difference { default: difference }
#   fixx11reg = yes | no { default: yes }
#   x11outlier = yes | no { default: yes }
}

spectrum{
   logqs = yes | no { default: no }
   print = See Table 1 for list of table names; Table 8 for tables that can only be saved.
   qcheck = yes | no { default: no }
   save = See Table 1 for list of table names
   savelog = See Table 2 for list of diagnostics
   start = *date* { default: eight years before end of span }
   tukey120 = yes | no { default: yes }
#   decibel = yes | no { default: yes }
#   difference = yes | no | first { default: yes, $\max(d + D - 1, 1)$ order of differencing }
#   maxar = 30 { set the maximum order of the AR spectrum (from 1 to 30), default: 30) }
#   peakwidth = 3 { determines width of band used to determine spectral peaks, default: 1 }
#   robustsa = yes | no { default: yes }
#   series = original | a1 | outlieradjoriginal | a19 | adjoriginal | b1 | modoriginal | e1 { default: b1 }
#   siglevel = 6 { determines level (number of stars) used to determine visual peaks, default: 6 }
#   type = arspec | periodogram { default: arspec }
}

transform{
   adjust = lom | loq | lpyear
   aicdiff = AICC difference needed to accept no transformation
      { default: -2.0 for monthly and quarterly series, 0.0 otherwise }
   file = "   "   **OR**   data = ( )
   format = "(*valid FORTRAN format*)" | "1r" | "2r" | "1l" | "2l" | "2l2" | "cs" | "cs2" | "free" |
     "freecomma" | "datevalue" | "datevaluecomma" | "tramo" | "x12save" | "x13save" { default: "free" }
   function = none | log | sqrt | inverse | logistic | auto { default: none }
   mode = percent | ratio | diff { default: percent }
   name = "   "
   power = power for Box-Cox power transformation { default: 1 (no transformation) }
   precision = 0 { number of input decimals, must be an integer from 0 to 5, inclusive }
   print = See Table 1 for list of table names
   save = See Table 1 for list of table names
   savelog = See Table 2 for list of diagnostics
   start = *date* { default: beginning of the series }
   title = "   "
   type = (temporary   permanent) { default: permanent }
#   constant = positive number to be added to the original series { default: no constant }
#   trimzero = yes | no | span { default: yes }
}

```
x11 {
    appendbcst = yes | no { default: no }
    appendfcst = yes | no { default: no }
    final = ao | ls | tc | user { default: all listed effects kept in final seasonally adjusted series }
    mode = mult | add | logadd | pseudoadd { default: mult }
    print = See Table 1 for list of table names
    save = See Table 1 for list of table names, and Table 3 for a list of tables that can be saved as percentages
    savelog = See Table 2 for list of diagnostics
    seasonalma = x11default | s3x1 | s3x3 | s3x5 | s3x9 | s3x15 | stable | msr { default: msr }
    sigmalim = (1.5 2.5) | (lower and upper sigma limits, both > 0)
    title = "        "
    trendma = any odd number less than or equal to 101 { default: automatic trend selection }
    type = sa | summary | trend { default: sa }
#   calendarsigma = all | signif | select | none { default: none }
#   centerseasonal = yes | no { default: no }
#   excludefcst = yes | no { default: no }
#   keepholiday = yes | no { default: no }
#   print1stpass = yes | no { default: no }
#   sfshort = yes | no { default: no }
#   sigmavec = list of months to be grouped together when calendarsigma = select
#   trendic = any number > 0 { default : depends on what is entered for trendma }
#   true7term = yes | no { default: no }
}

x11regression {
    aicdiff = difference needed for AIC-based test to accept regressor { default: 0.0 }
    aictest = (td | td1coef | tdstock | tdstock1coef    easter    user)
    critical = critical value for AO outlier testing { default: depends on length of span, see Table 4 }
    file = "        "    OR    data = ( )
    format = "( valid FORTRAN format )" | "datevalue"| "datevaluecomma" | "freecomma"
        | "free" | "tramo" | "x12save" | "x13save" { default: "free" }
    outliermethod = addone | addall { default: addone }
    outlierspan = ( startdate, enddate )
    print = See Table 1 for list of table names
    prior = yes | no { default: no }
    save = See Table 1 for list of table names
    savelog = See Table 2 for list of diagnostics
    sigma = any number > 0 { default: 2.5 }
    span = ( startdate, enddate ) { default: starting, ending date of span }
    start = date { default: the beginning of the series }
    tdprior = (td weight for each day of week) { default: no prior trading day }
    user = (names of user-defined regression variable(s))
    usertype = ( td    holiday    user )
    variables = (td | td1coef | tdstock[1 to 31] | tdstock1coef[1 to 31]    aodate
        easter[0 to 25] | sceaster[1 to 24]    labor[1 to 25]    thank[-8 to 17] )
#   almost = number greater than zero used to set threshold for almost outliers { default: 0.5 }
#   b = (fixed values for regression coefficients if specified with suffix f, e.g. -.6f; values specified without a
#       suffix f are ignored and these coefficients are estimated by OLS)
#   centeruser = mean | seasonal { default: user-defined regressors are not centered }
#   eastermeans = yes | no { default: yes }
#   forcecal = yes | no { default: no }
#   noapply = (td    holiday)
#   reweight = yes | no { default: no }
#   umfile = "     " { file containing user-defined mean }    OR    umdata = ( ) { user-defined mean }
#   umformat = "( valid FORTRAN format )" | "1r" | "2r" | "1l" | "2l" | "2l2" | "cs" | "cs2" |
#       "datevalue" | "datevaluecomma" | "free" | "freecomma" | "tramo" | "x12save" | "x13save"
#       { default: "free" }
#   umname = "     " { name of the user-defined mean }
#   umprecision = 0 { number of input decimals, must be an integer from 0 to 5, inclusive }
```

```
#    umstart = date { default: the beginning of the series }
#    umtrimzero = yes | no | span { default: yes }
}
```

Table 1: **Tables Printed or Saved by** `X-13ARIMA-SEATS`

Name	Abbrev.	Save Table?	Brief	Default	Spec
autochoice	ach		+	+	automdl
autochoicemdl	amd				automdl
autodefaulttests	adt				automdl
autofinaltests	aft				automdl
autoljungboxtest	alb				automdl
bestfivemdl	b5m				automdl
header	hdr		+	+	automdl
unitroottest	urt		+	+	automdl
unitroottestmdl	urm				automdl
acf	acf	+		+	check
acfplot	acp			+	check
acfsquared	ac2	+		+	check
acfsquaredplot	ap2			+	check
durbinwatson	dw			+	check
friedmantest	frt			+	check
histogram	hst			+	check
normalitytest	nrm			+	check
pacf	pcf	+			check
pacfplot	pcp				check
adjcompositeplot	b1p				composite
adjcompositesrs	b1	+	+	+	composite
calendaradjcomposite	cac	+			composite
compositeplot	cmp				composite
compositesrs	cms	+	+	+	composite
header	hdr		+	+	composite
indadjsatot	iaa	+	+	+	composite
indadjustfac	iaf	+		+	composite
indadjustmentratio	i18	+			composite
indaoutlier	iao	+		+	composite
indcalendar	ica	+		+	composite
indcalendaradjchanges	ie8	+		+	composite
indforcefactor	iff	+	+	+	composite
indftestd8	idf				composite
indirregular	iir	+		+	composite
indirregularplot	iip				composite
indlevelshift	ils	+		+	composite
indmcdmovavg	if1	+			composite
indmodirr	ie3	+			composite
indmodoriginal	ie1	+			composite
indmodsadj	ie2	+			composite
indqstat	if3				composite
indreplacsi	id9	+		+	composite
indresidualseasf	irf			+	composite
indrevsachanges	i6a	+		+	composite
indrndsachanges	i6r	+		+	composite
indrobustsa	iee	+			composite
indsachanges	ie6	+		+	composite
indsadjround	irn	+	+	+	composite
indseasadj	isa	+	+	+	composite
indseasadjplot	iap				composite
indseasonal	isf	+	+	+	composite
```

Table 1: X-13ARIMA-SEATS **Tables** (continued)

| Name | Abbrev. | Save Table? | Brief | Default | Spec |
|---|---|---|---|---|---|
| indseasonaldiff | isd | + | + | + | composite |
| indseasonalplot | isp | | | | composite |
| indtest | itt | | + | + | composite |
| indtotaladjustment | ita | + | | | composite |
| indtrend | itn | + | | + | composite |
| indtrendchanges | ie7 | + | | + | composite |
| indtrendplot | itp | | | | composite |
| indunmodsi | id8 | + | | + | composite |
| indx11diag | if2 | | | | composite |
| indyrtotals | ie4 | | | | composite |
| origchanges | ie5 | + | | + | composite |
| origwindsaplot | ie0 | | | | composite |
| outlieradjcomposite | oac | + | | | composite |
| prioradjcomposite | ia3 | + | | | composite |
| ratioplotindsa | ir2 | | | | composite |
| ratioplotorig | ir1 | | | | composite |
| armacmatrix | acm | + | | | estimate |
| averagefcsterr | afc | | | + | estimate |
| estimates | est | + | + | + | estimate |
| iterationerrors | ite | | | | estimate |
| iterations | itr | + | | | estimate |
| lformulas | lkf | | | | estimate |
| lkstats | lks | + | + | + | estimate |
| model | mdl | + | + | + | estimate |
| options | opt | | | + | estimate |
| regcmatrix | rcm | + | | | estimate |
| regressioneffects | ref | + | | | estimate |
| regressionresiduals | rrs | + | | | estimate |
| residuals | rsd | + | | | estimate |
| roots | rts | + | | | estimate |
| forcefactor | ffc | + | + | + | force |
| revsachanges | e6a | + | | + | force |
| rndsachanges | e6r | + | | + | force |
| saround | rnd | + | + | + | force |
| seasadjtot | saa | + | + | + | force |
| backcasts | bct | + | | | forecast |
| forecasts | fct | + | | + | forecast |
| transformed | ftr | + | | + | forecast |
| transformedbcst | btr | + | | | forecast |
| variances | fvr | + | | | forecast |
| armahistory | amh | + | + | + | history |
| chngestimates | che | + | | | history |
| chngrevisions | chr | + | | + | history |
| chngsummary | chs | | + | + | history |
| fcsterrors | fce | + | + | + | history |
| fcsthistory | fch | + | | | history |
| header | hdr | | + | + | history |
| indsaestimates | iae | + | | | history |
| indsarevisions | iar | + | | + | history |
| indsasummary | ias | | + | + | history |
| lkhdhistory | lkh | + | + | + | history |
| outlierhistory | rot | + | + | + | history |
| saestimates | sae | + | | | history |
| sarevisions | sar | + | | + | history |
| sasummary | sas | | + | + | history |
| seatsmdlhistory | smh | + | + | + | history |

Table 1: **X-13ARIMA-SEATS** Tables (continued)

| Name | Abbrev. | Save Table? | Brief | Default | Spec |
|---|---|---|---|---|---|
| sfestimates | sfe | + | | | history |
| sfilterhistory | sfh | + | | | history |
| sfrevisions | sfr | + | | + | history |
| sfsummary | sfs | | + | + | history |
| tdhistory | tdh | + | + | + | history |
| trendchngestimates | tce | + | | | history |
| trendchngrevisions | tcr | + | | + | history |
| trendchngsummary | tcs | | + | + | history |
| trendestimates | tre | + | | | history |
| trendrevisions | trr | + | | + | history |
| trendsummary | trs | | + | + | history |
| acf | iac | + | + | + | identify |
| acfplot | acp | | | + | identify |
| pacf | ipc | + | + | + | identify |
| pacfplot | pcp | | | + | identify |
| regcoefficients | rgc | | | | identify |
| finaltests | fts | + | | | outlier |
| header | hdr | | | + | outlier |
| iterations | oit | + | | | outlier |
| temporaryls | tls | | + | + | outlier |
| tests | ots | | | | outlier |
| header | hdr | | + | + | pickmdl |
| pickmdlchoice | pch | | + | + | pickmdl |
| usermodels | umd | | + | + | pickmdl |
| aictest | ats | | + | + | regression |
| aoutlier | ao | + | + | + | regression |
| chi2test | cts | | + | + | regression |
| dailyweights | tdw | | | | regression |
| holiday | hol | + | + | + | regression |
| levelshift | ls | + | + | + | regression |
| outlier | otl | + | + | + | regression |
| regressionmatrix | rmx | + | | | regression |
| regseasonal | a10 | + | + | + | regression |
| seasonaloutlier | so | + | + | + | regression |
| temporarychange | tc | + | + | + | regression |
| tradingday | td | + | + | + | regression |
| transitory | a13 | + | + | + | regression |
| userdef | usr | + | + | + | regression |
| adjustfac | s16 | + | | | seats |
| adjustmentratio | s18 | + | | | seats |
| cycle | cyc | + | | | seats |
| difforiginal | dor | + | | | seats |
| diffseasonaladj | dsa | + | | | seats |
| difftrend | dtr | + | | | seats |
| irregular | s13 | + | | | seats |
| irregularoutlieradj | se3 | + | | | seats |
| longtermtrend | ltt | + | | | seats |
| seasadjconst | sec | + | | | seats |
| seasonal | s10 | + | | | seats |
| seasonaladj | s11 | + | | | seats |
| seasonaladjfcstdecomp | afd | + | | | seats |
| seasonaladjoutlieradj | se2 | + | | | seats |
| seasonalfcstdecomp | sfd | + | | | seats |
| seasonalsum | ssm | + | | | seats |
| seriesfcstdecomp | ofd | + | | | seats |
| totaladjustment | sta | + | | | seats |

Table 1: **X-13ARIMA-SEATS Tables** (continued)

| Name | Abbrev. | Save Table? | Brief | Default | Spec |
|---|---|---|---|---|---|
| transitory | s14 | + | | | seats |
| transitoryfcstdecomp | yfd | + | | | seats |
| trend | s12 | + | | | seats |
| trendadjls | stl | + | | | seats |
| trendconst | stc | + | | | seats |
| trendfcstdecomp | tfd | + | | | seats |
| adjoriginal | b1 | + | + | + | series |
| adjorigplot | b1p | | | | series |
| calendaradjorig | a18 | + | | | series |
| header | hdr | | + | + | series |
| outlieradjorig | a19 | + | | | series |
| savefile | sav | | + | + | series |
| seriesmvadj | mv | + | + | + | series |
| seriesplot | a1p | | | | series |
| span | a1 | + | + | + | series |
| specfile | spc | + | + | + | series |
| chngspans | chs | + | | | slidingspans |
| factormeans | fmn | | | + | slidingspans |
| header | hdr | | + | + | slidingspans |
| indchngspans | cis | + | | | slidingspans |
| indfactormeans | fmi | | + | + | slidingspans |
| indpercent | pci | | + | + | slidingspans |
| indsaspans | ais | + | | | slidingspans |
| indsfspans | sis | + | | | slidingspans |
| indsummary | smi | | | + | slidingspans |
| indychngspans | yis | + | | | slidingspans |
| indyypercent | piy | | | | slidingspans |
| indyysummary | siy | | | | slidingspans |
| percent | pct | | + | + | slidingspans |
| saspans | ads | + | | | slidingspans |
| sfspans | sfs | + | | | slidingspans |
| ssftest | ssf | | | | slidingspans |
| summary | sum | | | + | slidingspans |
| tdspans | tds | + | | | slidingspans |
| ychngspans | ycs | + | | | slidingspans |
| yypercent | pcy | | | | slidingspans |
| yysummary | suy | | | | slidingspans |
| npsa | npa | | | | spectrum |
| npsaind | npi | | | | spectrum |
| qcheck | qch | | + | + | spectrum |
| qs | qs | | + | + | spectrum |
| qsind | qsi | | + | + | spectrum |
| speccomposite | is0 | + | + | + | spectrum |
| specextresiduals | ser | + | + | + | spectrum |
| specindirr | is2 | + | + | + | spectrum |
| specindsa | is1 | + | + | + | spectrum |
| specirr | sp2 | + | + | + | spectrum |
| specorig | sp0 | + | + | + | spectrum |
| specresidual | spr | + | | + | spectrum |
| specsa | sp1 | + | + | + | spectrum |
| specseatsirr | s2s | + | + | + | spectrum |
| specseatssa | s1s | + | + | + | spectrum |
| tukeypeaks | tpk | | + | + | spectrum |
| aictransform | tac | | + | + | transform |
| permprior | a2p | + | | | transform |
| permprioradjusted | a3p | + | | | transform |

Table 1: **X-13ARIMA-SEATS Tables** (continued)

| Name | Abbrev. | Save Table? | Brief | Default | Spec |
|---|---|---|---|---|---|
| permprioradjustedptd | a4p | + | | | transform |
| prior | a2 | + | + | + | transform |
| prioradjusted | a3 | + | | | transform |
| prioradjustedptd | a4d | + | | | transform |
| seriesconstant | a1c | + | + | + | transform |
| seriesconstantplot | acp | | | | transform |
| tempprior | a2t | + | | | transform |
| transformed | trn | + | | | transform |
| adjoriginalc | c1 | + | | | x11 |
| adjoriginald | d1 | + | | | x11 |
| adjustdiff | fad | + | + | + | x11 |
| adjustfac | d16 | + | + | + | x11 |
| adjustmentratio | e18 | + | | + | x11 |
| autosf | asf | | | | x11 |
| biasfactor | bcf | + | | | x11 |
| calendar | d18 | + | + | + | x11 |
| calendaradjchanges | e8 | + | | + | x11 |
| combholiday | chl | + | + | + | x11 |
| extreme | c20 | + | | | x11 |
| extremeb | b20 | + | | | x11 |
| ftestb1 | b1f | | | | x11 |
| ftestd8 | d8f | | | | x11 |
| irregular | d13 | + | | + | x11 |
| irregularadjao | ira | + | | | x11 |
| irregularb | b13 | + | | | x11 |
| irregularc | c13 | + | | | x11 |
| irregularplot | irp | | | | x11 |
| irrwt | c17 | + | | + | x11 |
| irrwtb | b17 | + | | | x11 |
| mcdmovavg | f1 | + | | | x11 |
| modirregular | e3 | + | | | x11 |
| modoriginal | e1 | + | | | x11 |
| modseasadj | e2 | + | | | x11 |
| modsic4 | c4 | + | | | x11 |
| modsid4 | d4 | + | | | x11 |
| movseasrat | d9a | | | + | x11 |
| origchanges | e5 | + | | + | x11 |
| origwsaplot | e0 | | | | x11 |
| qstat | f3 | | | | x11 |
| ratioplotorig | ra1 | | | | x11 |
| ratioplotsa | ra2 | | | | x11 |
| replacsi | d9 | + | | + | x11 |
| replacsib4 | b4 | | | | x11 |
| replacsib9 | b9 | | | | x11 |
| replacsic9 | c9 | + | | | x11 |
| residualseasf | rsf | | | | x11 |
| robustsa | e11 | + | | | x11 |
| sachanges | e6 | + | | + | x11 |
| seasadj | d11 | + | + | + | x11 |
| seasadjb11 | b11 | + | | | x11 |
| seasadjb6 | b6 | + | | | x11 |
| seasadjc11 | c11 | + | | | x11 |
| seasadjc6 | c6 | + | | | x11 |
| seasadjconst | sac | + | + | + | x11 |
| seasadjd6 | d6 | + | | | x11 |
| seasadjplot | sap | | | | x11 |

Table 1: **X-13ARIMA-SEATS Tables** (continued)

| Name | Abbrev. | Save Table? | Brief | Default | Spec |
|---|---|---|---|---|---|
| seasonal | d10 | + | + | + | x11 |
| seasonaladjregsea | ars | + | + | + | x11 |
| seasonalb10 | b10 | + | | | x11 |
| seasonalb5 | b5 | + | | | x11 |
| seasonalc10 | c10 | + | | | x11 |
| seasonalc5 | c5 | + | | | x11 |
| seasonald5 | d5 | + | | | x11 |
| seasonaldiff | fsd | + | + | + | x11 |
| seasonalplot | sfp | | | | x11 |
| sib3 | b3 | + | | | x11 |
| sib8 | b8 | + | | | x11 |
| tdadjorig | c19 | + | | | x11 |
| tdadjorigb | b19 | + | | | x11 |
| tdaytype | tdy | | + | + | x11 |
| totaladjustment | tad | + | | + | x11 |
| trend | d12 | + | | + | x11 |
| trendadjls | tal | + | | | x11 |
| trendb2 | b2 | + | | | x11 |
| trendb7 | b7 | + | | | x11 |
| trendc2 | c2 | + | | | x11 |
| trendc7 | c7 | + | | | x11 |
| trendchanges | e7 | + | | + | x11 |
| trendconst | tac | + | | | x11 |
| trendd2 | d2 | + | | | x11 |
| trendd7 | d7 | + | | | x11 |
| trendplot | trp | | | | x11 |
| unmodsi | d8 | + | | + | x11 |
| unmodsiox | d8b | + | | + | x11 |
| x11diag | f2 | | | | x11 |
| yrtotals | e4 | + | | + | x11 |
| calendar | xca | + | + | + | x11regression |
| calendarb | bxc | + | | | x11regression |
| combcalendar | xcc | + | + | + | x11regression |
| combcalendarb | bcc | + | | | x11regression |
| combtradingday | c18 | + | + | + | x11regression |
| combtradingdayb | b18 | + | | | x11regression |
| extremeval | c14 | + | | + | x11regression |
| extremevalb | b14 | + | | | x11regression |
| holiday | xhl | + | + | + | x11regression |
| holidayb | bxh | + | | | x11regression |
| outlierfinaltests | xft | | | | x11regression |
| outlierhdr | xoh | | | + | x11regression |
| outlieriter | xoi | + | | | x11regression |
| outliertests | xot | | | | x11regression |
| priortd | a4 | + | + | + | x11regression |
| tradingday | c16 | + | + | + | x11regression |
| tradingdayb | b16 | + | | | x11regression |
| x11reg | c15 | + | | + | x11regression |
| x11regb | b15 | + | | | x11regression |
| xaictest | xat | | + | + | x11regression |
| xregressioncmatrix | xrc | + | | | x11regression |
| xregressionmatrix | xrm | + | | | x11regression |

Table 2: **Diagnostics Saved to Log File by X-13ARIMA-SEATS**

| Name | Abbrev. | Spec | Name | Abbrev. | Spec |
|---|---|---|---|---|---|
| alldiagnostics | all | automdl | chi2test | cts | regression |
| automodel | amd | automdl | seatsmodel | smd | seats |
| autodiff | adf | automdl | x13model | xmd | seats |
| bestfivemdl | b5m | automdl | durbinwatson | dws | seats |
| mean | mu | automdl | friedman | frs | seats |
| alldiagnostics | all | check | normalitytest | nrm | seats |
| boxpierceq | bpq | check | totalsquarederror | tse | seats |
| durbinwatson | dw | check | componentvariance | cvr | seats |
| friedmantest | frt | check | concurrentesterror | cee | seats |
| ljungboxq | lbq | check | percentreductionse | prs | seats |
| normalitytest | nrm | check | averageabsdiffannual | aad | seats |
| seasftest | sft | check | seasonalsignif | ssg | seats |
| tdftest | tft | check | overunderestimation | oue | seats |
| indfstabled8 | id8 | composite | alldiagnostics | all | seats |
| indicratio | iir | composite | percent | pct | slidingspans |
| indidseasonal | iid | composite | percents | pcs | slidingspans |
| indm1 | im1 | composite | dirnpsa | dnp | spectrum |
| indm10 | imt | composite | dirpeaks | dpk | spectrum |
| indm11 | ime | composite | dirqs | dqs | spectrum |
| indm2 | im2 | composite | dirtukeypeaks | dtp | spectrum |
| indm3 | im3 | composite | indnpsa | inp | spectrum |
| indm4 | im4 | composite | indpeaks | ipk | spectrum |
| indm5 | im5 | composite | indqs | iqs | spectrum |
| indm6 | im6 | composite | indtukeypeaks | itp | spectrum |
| indm7 | im7 | composite | npsa | npa | spectrum |
| indm8 | im8 | composite | peaks | spk | spectrum |
| indm9 | im9 | composite | qcheck | qch | spectrum |
| indmovingseasf | isf | composite | qs | qs | spectrum |
| indmovingseasratio | isr | composite | tukeypeaks | tpk | spectrum |
| indq | iq | composite | alldiagnostics | all | spectrum |
| indq2 | iq2 | composite | autotransform | atr | transform |
| indtest | itt | composite | fstableb1 | fb1 | x11 |
| alldiagnostics | all | composite | fstabled8 | fd8 | x11 |
| aic | aic | estimate | icratio | icr | x11 |
| aicc | acc | estimate | idseasonal | ids | x11 |
| averagefcsterr | afc | estimate | m1 | m1 | x11 |
| bic | bic | estimate | m10 | m10 | x11 |
| hannanquinn | hq | estimate | m11 | m11 | x11 |
| roots | rts | estimate | m2 | m2 | x11 |
| alldiagnostics | all | estimate | m3 | m3 | x11 |
| aveabsrevchng | ach | history | m4 | m4 | x11 |
| aveabsrevindsa | iaa | history | m5 | m5 | x11 |
| aveabsrevsa | asa | history | m6 | m6 | x11 |
| aveabsrevsf | asf | history | m7 | m7 | x11 |
| aveabsrevsfproj | asp | history | m8 | m8 | x11 |
| aveabsrevtrend | atr | history | m9 | m9 | x11 |
| aveabsrevtrendchng | atc | history | movingseasf | msf | x11 |
| avesumsqfcsterr | afe | history | movingseasratio | msr | x11 |
| alldiagnostics | all | history | q | q | x11 |
| identified | id | outlier | q2 | q2 | x11 |
| automodel | amd | pickmdl | alldiagnostics | all | x11 |
| aictest | ats | regression | aictest | ats | x11regression |

| name | short | spec | description of table |
|---|---|---|---|
| indadjustfacpct | ipf | composite | indirect combined adjustment factors expressed as percentages if appropriate |
| indcalendaradjchangespct | ip8 | composite | percent changes in original series adjusted for calendar effects |
| indirregularpct | ipi | composite | indirect irregular component expressed as percentages if appropriate |
| indrevsachangespct | ipa | composite | percent changes for indirect seasonally adjusted series with forced yearly totals |
| indrndsachangespct | ipr | composite | percent changes for rounded indirect seasonally adjusted series |
| indsachangespct | ip6 | composite | percent changes for indirect seasonally adjusted series |
| indseasonalpct | ips | composite | indirect seasonal component expressed as percentages if appropriate |
| indtrendchangespct | ip7 | composite | percent changes for indirect trend component |
| origchangespct | ip5 | composite | percent changes for composite series |
| revsachangespct | p6a | force | percent changes in seasonally adjusted series with forced yearly totals |
| rndsachangespct | p6r | force | percent changes in rounded seasonally adjusted series |
| adjustfacpct | psa | seats | combined adjustment factors, expressed as percentages if appropriate |
| irregularpct | psi | seats | final irregular component, expressed as percentages if appropriate |
| seasonalpct | pss | seats | final seasonal factors, expressed as percentages if appropriate |
| transitorypct | psc | seats | final transitory component, expressed as percentages if appropriate |
| adjustfacpct | paf | x11 | combined adjustment factors, expressed as percentages if appropriate |
| calendaradjchangespct | pe8 | x11 | percent changes in original series adjusted for calendar factors |
| irregularpct | pir | x11 | final irregular component, expressed as percentages if appropriate |
| origchangespct | pe5 | x11 | percent changes in the original series |
| sachangespct | pe6 | x11 | percent changes in seasonally adjusted series |
| seasonalpct | psf | x11 | final seasonal factors, expressed as percentages if appropriate |
| trendchangespct | pe7 | x11 | percent changes in final trend cycle |

*Name* gives the name of each plot for use with the **save** argument.

*Short* gives a short name for these tables.

*Spec* indicates the corresponding spec for each table.

Table 3: **Tables Savable as Percentages with** `save` **Argument**

| Number of Observations Tested | Outlier Critical Value | Number of Observations Tested | Outlier Critical Value |
|---|---|---|---|
| 1 | 1.9600 | 48 | 3.6273 |
| 2 | 2.2365 | 72 | 3.7323 |
| 3 | 2.4449 | 96 | 3.8007 |
| 4 | 2.6180 | 120 | 3.8508 |
| 5 | 2.7455 | 144 | 3.8898 |
| 6 | 2.8433 | 168 | 3.9169 |
| 7 | 2.9215 | 192 | 3.9217 |
| 8 | 2.9859 | 216 | 3.9484 |
| 9 | 3.0403 | 240 | 3.9714 |
| 10 | 3.0871 | 264 | 4.0093 |
| 11 | 3.1280 | 288 | 4.0253 |
| 12 | 3.1643 | 312 | 4.0398 |
| 24 | 3.4194 | 336 | 4.0529 |
| 36 | 3.5458 | 360 | 4.0650 |

Table 4: **Default Critical Values for Outlier Identification**

| *SEATS file* | `X-13A-S` *extension* | *Contents of file* |
|---|---|---|
| `rogtable.out` | `.rog` | Selected statistics from the growth rate output |
| `summarys.txt` | `.sum` | Summary information and diagnostics from SEATS adjustment |
| `table-s.out` | `.tbs` | Annotated listing of the series, the seasonally adjusted series, and model-based seasonal adjustment components, saved in columns separated by white space |

Table 5: `X-13ARIMA-SEATS` **File Extensions for Special SEATS Saved Output**

| *Code* | *Description of table* |
|---|---|
| all | all series |
| xo | original series |
| n | seasonally adjusted series |
| s | seasonal factors |
| p | trend-cycle |
| u | irregular |
| c | transitory |
| cal | calendar |
| pa | preadjustment factor |
| cy | cycle |
| ltp | long term trend |
| er | residuals |
| rg0 | separate regression component |
| rgsa | regression component in seasonally adjusted series |
| stp | stochastic trend cycle |
| stn | stochastic seasonally adjusted series |
| rtp | real time trend cycle |
| rtsa | teal time seasonally adjusted series |

*Code* gives the code used to specify the series in the **tabtables** argument
of the **seats** spec.

Table 6: **Components Savable in `.tbs` file**

| Name | Short | Description of table |
|------|-------|----------------------|
| componentmodels | mdc | models for the components |
| filtersaconc | fac | concurrent finite seasonal adjustment filter |
| filtersasym | faf | symmetric finite seasonal adjustment filter |
| filtertrendconc | ftc | concurrent finite trend filter |
| filtertrendsym | ftf | symmetric finite trend filter |
| pseudoinnovsadj | pia | pseudo-innovations of the final SEATS seasonal adjustment |
| pseudoinnovseasonal | pis | pseudo-innovations of the seasonal component |
| pseudoinnovtransitory | pit | pseudo-innovations of the transitory component |
| pseudoinnovtrend | pic | pseudo-innovations of the trend component |
| squaredgainsaconc | gac | squared gain for finite concurrent seasonal adjustment filter |
| squaredgainsasym | gaf | squared gain for finite symmetric seasonal adjustment filter |
| squaredgaintrendconc | gtc | squared gain for finite concurrent trend filter |
| squaredgaintrendsym | gtf | squared gain for finite symmetric trend filter |
| timeshiftsaconc | tac | time shift for finite concurrent seasonal adjustment filter |
| timeshifttrendconc | ttc | time shift for finite concurrent trend filter |
| wkendfilter | wkf | end filters of the semi-infinite Wiener-Kolmogorov filter |
| seasonaladjse | ase | standard error of final seasonally adjusted series |
| seasonalse | sse | standard error of final steasonal component |
| transitoryse | cse | standard error of final transitory component |
| trendse | tse | standard error of final trend component |

Table 7: **Output Tables Available Only with `save` Argument for Seats**

| Name | Short | Description of table |
|------|-------|----------------------|
| spectukeyorig | st0 | Tukey spectral estimates of the first-differenced original series |
| spectukeysa | st1 | Tukey spectral estimates of differenced, `X-11` seasonally adjusted series (or of the logged seasonally adjusted series if `mode = logadd` or `mode = mult`) |
| spectukeyirr | st2 | Tukey spectral estimates of outlier-modified `X-11` irregular series |
| spectukeyseatssa | t1s | Tukey spectrum of the differenced final SEATS seasonal adjustment |
| spectukeyseatsirr | t2s | Tukey spectrum of the final SEATS irregular |
| spectukeyextresiduals | ter | Tukey spectrum of the extended residuals |
| spectukeyresidual | str | Tukey spectral estimates of the regARIMA model residuals |
| spectukeycomposite | it0 | Tukey spectral estimates of first-differenced aggregate series |
| spectukeyindsa | it1 | Tukey spectral estimates of the first-differenced indirect seasonally adjusted series |
| spectukeyindirr | it2 | Tukey spectral estimates of outlier-modified irregular series from the indirect seasonal adjustment |

Table 8: **Output Tables Available Only with `save` Argument for Spectrum**

Table 9: **Graphics Metafile Codes**

| Code | Description |
|------|-------------|
| acf | residual autocorrelations |
| acf2 | squared residual autocorrelations |
| adjcori | composite series (prior adjusted) |
| ador | original series (prior adjusted) |
| ahst | concurrent and revised seasonal adjustments and revisions |
| aichst | revision history of the likelihood statistics |
| ao | regARIMA AO outlier component |
| arat | final adjustment ratios |
| armahst | ARMA model coefficient history |
| bct | point backcasts and prediction intervals on the original scale |
| btr | point backcasts and standard errors for the transformed data |
| cad | regARIMA calendar adjusted original data |
| caf | combined adjustment factors |

Table 9: **Graphics Metafile Codes (continued)**

| Code | Description |
|------|-------------|
| cal | combined calendar adjustment factors |
| ccal | final combined calendar factors from irregular component regression |
| cfchst | forecast and forecast error history |
| chol | combined holiday component |
| chss | sliding spans of the changes in the seasonally adjusted series |
| cmpcad | regARIMA calendar adjusted composite data |
| cmpoad | regARIMA outlier adjusted composite data |
| cmpori | composite time series data (for the span analyzed) |
| cmppadj | prior adjusted composite data |
| cmpspor | spectrum of the composite series |
| cmpsptukor | Tukey spectrum of the composite series |
| csahst | history of the period-to-period changes changes of the adjustments |
| ctd | final combined trading day factors from irregular component regression |
| ctrhst | history of the period-to-period changes of the trend-cycle values |
| fct | point forecasts and prediction intervals on the original scale |
| fcthst | revision history of the out-of-sample forecasts |
| fintst | final outlier test statistics |
| fltsac | concurrent seasonal adjustment filter |
| fltsaf | symmetric seasonal adjustment filter |
| flttrnc | concurrent trend filter |
| flttrnf | symmetric trend filter |
| frfc | factors applied to get adjusted series with forced yearly totals |
| ftr | point forecasts and standard errors for the transformed data |
| idacf | residual autocorrelations for different orders of differencing |
| idpacf | residual partial autocorrelations for different orders of differencing |
| indahst | concurrent and revised indirect seasonal adjustments and revisions |
| indao | indirect additive outlier adjustment factors |
| indarat | indirect final adjustment ratios |
| indcaf | indirect combined adjustment factors |
| indcal | indirect calendar component |
| indchss | sliding spans of the changes in the indirect seasonally adjusted series |
| indfrfc | factors applied to get indirect adjusted series with forced yearly totals |
| indirr | indirect irregular component |
| indls | indirect level shift adjustment factors |
| indmirr | irregular component modified for extremes from indirect adjustment |
| indmori | original data modified for extremes from indirect adjustment |
| indmsa | seasonally adjusted data modified for extremes from indirect adjustment |
| indrsi | final replacement values for SI component of indirect adjustment |
| indsa | indirect seasonally adjusted data |
| indsar | rounded indirect final seasonally adjusted series |
| indsass | sliding spans of the indirect seasonally adjusted series |
| indsat | final indirect seasonally adjusted series with forced yearly totals |
| indsf | indirect seasonal component |
| indsfss | sliding spans of the indirect seasonal factors |
| indsi | indirect unmodified SI component |
| indspir | spectrum of indirect modified irregular component |
| indspsa | spectrum of differenced indirect seasonally adjusted series |
| indsptukir | Tukey spectrum of indirect modified irregular component |
| indsptuksa | Tukey spectrum of differenced indirect seasonally adjusted series |
| indtadj | indirect total adjustment factors |
| indtrn | indirect trend cycle |
| indyyss | sliding spans of the year-to-year changes in the indirect seasonally adjusted series |
| irr | final irregular component |
| irrwt | final weights for irregular component |
| ls | regARIMA level shift outlier component |
| mdlest | regression and ARMA parameter estimates |

Table 9: **Graphics Metafile Codes (continued)**

| Code | Description |
|------|-------------|
| mirr | modified irregular series |
| mori | original data modified for extremes |
| msa | modified seasonally adjusted series |
| mvadj | original series adjusted for missing value regressors |
| oad | regARIMA outlier adjusted original data |
| ori | time series data (for the span analyzed) |
| oricnt | time series data plus constant (for the span analyzed) |
| orifctd | series forecast decomposition (SEATS) |
| otl | regARIMA combined outlier component |
| pacf | residual partial autocorrelation |
| padj | prior-adjusted data |
| padjt | prior-adjusted data (including prior trading day adjustments) |
| ppradj | permanent prior-adjusted data |
| ppradjt | permanent prior-adjusted data (including prior trading day adjustments) |
| pprior | permanent prior-adjustment factors |
| prior | prior-adjustment factors |
| ptd | prior trading day factors |
| regrsd | residuals from the estimated regression effects |
| rgseas | regARIMA user-defined seasonal component |
| rhol | regARIMA holiday component |
| rsi | final replacement values for SI ratios |
| rtd | regARIMA trading day component |
| sa | final seasonally adjusted data |
| sac | final seasonally adjusted series with constant value added |
| safctd | final seasonally adjusted series forecast decomposition (SEATS) |
| sar | rounded final seasonally adjusted series |
| sass | sliding spans of the seasonally adjusted series |
| sat | final seasonally adjusted series with forced yearly totals |
| seataf | final combined adjustment factors (SEATS) |
| seatase | standard error of final seasonally adjusted series (SEATS) |
| seatcse | standard error of final transitory component (SEATS) |
| seatcyc | final cycle |
| seatdori | differenced original series after transformation, prior adjustment (SEATS) |
| seatdsa | differenced final seasonally adjusted series (SEATS) |
| seatdtr | differenced final trend (SEATS) |
| seatirr | final irregular component (SEATS) |
| seatirrotl | final irregular component outlier adjusted (SEATS) |
| seatltt | final long term trend |
| seatsa | final seasonally adjusted series (SEATS) |
| seatsaotl | final seasonally adjusted series adjusted for outliers (SEATS) |
| seatsf | final seasonal component (SEATS) |
| seatsse | standard error of final seasonal component (SEATS) |
| seatssm | sum of final seasonal component (SEATS) |
| seattrn | final trend component (SEATS) |
| seattse | standard error of final trend component (SEATS) |
| setarat | final adjustment ratios (SEATS) |
| setsac | final seasonally adjusted series with constant value added (SEATS) |
| settadj | total adjustment factors (SEATS) |
| settrc | final trend cycle with constant value added (SEATS) |
| settrns | final transitory component (SEATS) |
| sf | final seasonal factors |
| sffctd | final seasonal component forecast decomposition (SEATS) |
| sfhst | concurrent and projected seasonal component and their percent revisions |
| sfr | seasonal factors, adjusted for user-defined seasonal regARIMA component |
| sfss | sliding spans of the seasonal factors |
| sgsac | squared gain of the concurrent seasonal adjustment filter |

| Code | Description |
|---|---|
| sgsaf | squared gain of the symmetric seasonal adjustment filter |
| sgtrnc | squared gain of the concurrent trend filter |
| sgtrnf | squared gain of the symmetric trend filter |
| si | final unmodified SI ratios |
| siox | final unmodified SI ratios, with labels for outliers and extreme values |
| so | regARIMA seasonal outlier component |
| spcsir | spectrum of the irregular component (SEATS) |
| spcssa | spectrum of the seasonally adjusted series (SEATS) |
| spctuksir | Tukey spectrum of the irregular component (SEATS) |
| spctukssa | Tukey spectrum of the seasonally adjusted series (SEATS) |
| spexrsd | spectrum of the extended residuals (SEATS) |
| spir | spectrum of modified irregular series |
| spor | spectrum of the original series |
| sprsd | spectrum of the regARIMA model residuals |
| spsa | spectrum of differenced seasonally adjusted series |
| sptukexrsd | Tukey spectrum of the extended residuals (SEATS) |
| sptukir | Tukey spectrum of modified irregular series |
| sptukor | Tukey spectrum of the original series |
| sptukrsd | Tukey spectrum of the regARIMA model residuals |
| sptuksa | Tukey spectrum of differenced seasonally adjusted series |
| tadj | total adjustment factors |
| tc | regARIMA temporary change outlier component |
| tdhst | trading day coefficient history |
| tdss | sliding spans of the trading day factors |
| tprior | temporary prior-adjustment factors |
| trancmp | regARIMA transitory component |
| tranfcd | final transitory component forecast decomposition (SEATS) |
| trn | final trend cycle |
| trnfctd | final trend component forecast decomposition (SEATS) |
| trnhst | concurrent and revised Henderson trend-cycle values and revisions |
| tssac | time shift of the concurrent seasonal adjustment filter |
| tstrnc | time shift of the concurrent trend filter |
| usrdef | regARIMA user-defined regression component |
| xcal | final calendar factors from irregular component regression |
| xhol | final holiday factors from irregular component regression |
| xtd | final trading day factors from irregular component regression |
| xtrm | final extreme value adjustment factors |
| yyss | sliding spans of the year-to-year changes in the seasonally adjusted series |