**YATES CUTOFF**

**PURPOSE**
Specify which factor estimates are printed by the YATES ANALYSIS command.

**DESCRIPTION**
The YATES ANALYSIS command estimates the factor effects in 2-level full factorial and fractional factorial designs. It yields factor estimates for all of the coefficients (main effects and all relevant interactions). The primary output from the Yates analysis is a list which consists of 5 columns:

1. A factor identifier (all from Yates order):
   - 1 = factor 1
   - 2 = factor 2
   - 3 = factor 3
   - 12 = factor 1 x factor 2 interaction
   - 13 = factor 1 x factor 3 interaction
   - 23 = factor 2 x factor 3 interaction
   - 123 = factor 1 x factor 2 x factor 3 interaction
   etc.

2. Least squares estimated factor effects ordered from largest in magnitude (most significant) to smallest in magnitude (least significant).

3. A t value (= e / sd(e)) where
   - e is the estimated factor effect;
   - sd(e) is the estimated standard deviation of e.
   Adjacent to this t value is an indication (** or ***) as to whether the estimated effects are statistically significant at the 5% level (** or *) or 1% (***) level.

4. The residual standard deviation that results from the model:
   - response = constant + 1/2 (that single factor only)
   This information is of interest but not that important.

5. The (cumulative) residual standard deviation that results from the model:
   - response = constant + 1/2 (all factors down to and including the factor of interest).
   This column will consist of a monotonically decreasing set of residual standard deviations (indicating a better and better fit as the number of terms included in the model increases). The cumulative residual standard deviation at the top of the column is for the simplest model:
   - response = constant + no factors
   The cumulative residual standard deviation (identically 0) at the bottom of the column is for the most complicated model:
   - response = constant + 1/2 (all factors and interactions)

The YATES CUTOFF command is used to control which factor estimates are printed. The criterion can be given in terms of the t-values (column 3 as described above), of the residual standard deviation (column 4 as described above), or in terms of the absolute value of the coefficient (column 2 as described above).

**SYNTAX 1**
YATES COEF CUTOFF <value>
where <value> is a number or parameter that specifies the cutoff value for the estimated factor coefficient.

Only factor estimates that have a coefficient with an absolute value less than or equal to <value> are printed.

**SYNTAX 2**
YATES T CUTOFF <value>
where <value> is a number or parameter that specifies the cutoff value for the estimated factor t-value.

Only factor estimates that have a t-value with an absolute value greater than or equal to <value> are printed.

**SYNTAX 3**
YATES RESSD CUTOFF <value>
where \(<value>\) is a number or parameter that specifies the cutoff value for the estimated factor residual standard deviation. Only factor estimates that have a residual standard deviation less than or equal to \(<value>\) are printed.

**EXAMPLES**

YATES COEF CUTOFF 10
YATES T CUTOFF 1.0
YATES RESSD CUTOFF 0.5

**NOTE**

All 3 criteria (COEF/T/RESSD) can be specified for the same Yates analysis. These criteria are tested independently of each other.

**DEFAULT**

All factor estimates are printed.

**SYNONYMS**

None

**RELATED COMMANDS**

YATES ANALYSIS = Carries out a Yates analysis.
YATES OUTPUT = Specify which sections of the Yates analysis to print.

**APPLICATIONS**

Design of Experiments

**IMPLEMENTATION DATE**

89/12

**PROGRAM**

. THIS IS AN EXAMPLE OF A YATES ANALYSIS
. OF A 2**3 FULL FACTORIAL DESIGN.
SKIP 25
READ BOXSPRIN.DAT Y X1 X2 X3
SKIP 0
YATES Y
YATES COEF CUTOFF 5
YATES Y
YATES COEF CUTOFF INFINITY
YATES T CUTOFF 1.0
YATES Y
YATES T CUTOFF INFINITY
YATES RESSD CUTOFF 0.5
YATES Y
The following output is

```
***************
**  YATES Y  **
***************
```

```
****************************
**      2**K DEX FIT       **
*****************************
```

(NOTE--DATA MUST BE IN STANDARD ORDER)
NUMBER OF OBSERVATIONS = 8
NUMBER OF FACTORS = 3
NO REPLICATION CASE

PSUEDO-REPLICATION STAND. DEV. = 0.70710676908E+00
PSUEDO-DEGREES OF FREEDOM = 1
(THE PSEUDO-REP. STAND. DEV. ASSUMES ALL
3, 4, 5, ...-TERM INTERACTIONS ARE NOT REAL,
BUT MANIFESTATIONS OF RANDOM ERROR)

STANDARD DEVIATION OF A COEF. = 0.50000000000E+00
(BASED ON PSEUDO-REP. ST. DEV.)

GRAND MEAN = 0.71250000000E+02
GRAND STANDARD DEVIATION = 0.13719120979E+02

99% CONFIDENCE LIMITS (+-) = 0.31828401566E+02
95% CONFIDENCE LIMITS (+-) = 0.63531084061E+01
99.5% POINT OF T DISTRIBUTION = 0.63656803131E+02
97.5% POINT OF T DISTRIBUTION = 0.12706216812E+02

<table>
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<tr>
<th>IDENTIFIER</th>
<th>EFFECT</th>
<th>T VALUE</th>
<th>RESSD</th>
<th>RESSD</th>
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NOTE--TAG, COEF, TCOEF, RESSD, & CUMULATIVE RESSD
WRITTEN TO FILES DPST1F.DAT AND DPST2F.DAT
** YATES CUTOFF **

*** YATES Y ***

***********************************************
** 2**K DEX FIT  **
***********************************************

(NOTE--DATA MUST BE IN STANDARD ORDER)
NUMBER OF OBSERVATIONS = 8
NUMBER OF FACTORS = 3
NO REPLICATION CASE

PSEUDO-REPLICATION STAND. DEV. = 0.70710676908E+00
PSEUDO-DEGREES OF FREEDOM = 1
(THE PSEUDO-REP. STAND. DEV. ASSUMES ALL
3, 4, 5, ...-TERM INTERACTIONS ARE NOT REAL,
BUT MANIFESTATIONS OF RANDOM ERROR)

STANDARD DEVIATION OF A COEF. = 0.50000000000E+00
(BASED ON PSEUDO-REP. ST. DEV.)

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NOTE--TAG, COEF, TCOEF, RESSD, & CUMULATIVE RESSD
WRITTEN TO FILES DPST1F.DAT AND DPST2F.DAT
Support Commands

***************
** YATES Y **
***************

******************************
** 2**K DEX FIT  **
******************************

(NOTE--DATA MUST BE IN STANDARD ORDER)
NUMBER OF OBSERVATIONS = 8
NUMBER OF FACTORS = 3
NO REPLICATION CASE

PSEUDO-REPPLICATION STAND. DEV. = 0.70710676908E+00
PSEUDO-DEGREES OF FREEDOM = 1
(THE PSEUDO-REP. STAND. DEV. ASSUMES ALL
3, 4, 5, ...-TERM INTERACTIONS ARE NOT REAL,
BUT MANIFESTATIONS OF RANDOM ERROR)

STANDARD DEVIATION OF A COEF. = 0.50000000000E+00
(BASED ON PSEUDO-REP. ST. DEV.)

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** YATES Y **

***************
** 2**K DEX FIT **
***************

(Note--Data must be in standard order)
Number of observations = 8
Number of factors = 3
No replication case

Pseudo-replication standard deviation = 0.70710676908E+00
Pseudo-degrees of freedom = 1
(The pseudo-rep. stand. dev. assumes all 3, 4, 5, ...-term interactions are not real, but manifestations of random error)

Standard deviation of a coef. = 0.50000000000E+00
(Based on pseudo-rep. st. dev.)

Grand mean = 0.71250000000E+02
Grand standard deviation = 0.13719120979E+02

99% confidence limits (++) = 0.31828401566E+02
95% confidence limits (--) = 0.63531084061E+01
99.5% point of t distribution = 0.63656803131E+02
97.5% point of t distribution = 0.12706216812E+02

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Note--Tag, coef, tcoef, ressd, & cumulative ressd
written to files dpst1f.dat and dpst2f.dat