



AHELP for CIAO 3.4

chiprimini

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Synopsis

Chi-square statistic with Primini variance function.

Description

The chi-square statistic is a biased estimator of model parameters (unlike the likelihood functions). In an attempt to remove this bias, Kearns, Primini, & Alexander (1995, ADASS IV, 331) use a scheme dubbed 'Iterative Weighting' (IW; see Wheaton et al. 1995, ApJ 438, 322), in which

$$\sigma(i)^2 = S[i, x(i), pS^{(j-1)}] + [A(N)/A(B)]^2 B_{\text{off}}[i, x(i), pB^{(j-1)}],$$

where j is the number of iterations that have been carried out in the fitting process, B_{off} is the background model amplitude in bin i of the off-source region, and $pS^{(j-1)}$ and $pB^{(j-1)}$ are the set of source and background model parameter values derived during the iteration previous to the current one.

In addition to reducing parameter estimate bias, it can be used even when the number of counts in each bin is small (< 5), although the user should proceed with caution.

Note on Background Subtraction

The background should not be subtracted from the data when this statistic is used. CHI PRIMINI underestimates the variance when fitting background-subtracted data.

See CHISQUARE for more information, including definitions of the quantities shown above.

Example

Specify the fitting statistic and then confirm it has been set.

```
sherpa> STATISTIC CHI PRIMINI
WARNING: with CHI PRIMINI, displayed error bars will only be
         correct after a fit is performed with the current filter.
sherpa> SHOW STATISTIC
Statistic:                Chi-Squared Primini
```

Bugs

See the [Sherpa bug pages](#) online for an up-to-date listing of known bugs.

See Also

sherpa

[bayes](#), [cash](#), [chicvar](#), [chidvar](#), [chigehrels](#), [chimvar](#), [chisquare](#), [cstat](#), [get_stat_expr](#), [statistic](#), [truncate](#),
[userstat](#)

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URL:
<http://cxc.harvard.edu/ciao3.4/chiprimini.html>
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