URL: http://cxc.harvard.edu/ciao3.4/grid.html
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AHELP for CIAO 3.4

grid

Context: sherpa

Jump to: Description Parameters Bugs See Also

Synopsis

A grid search of parameter space, with no minimization.

Syntax

```
grid  [totdim] [nloopi]
```

Description

The GRID method samples the parameter space bounded by the lower and upper limits for each thawed parameter. At each grid point, the fit statistic is evaluated. The advantage of GRID is that it can provide a thorough sampling of parameter space. This is good for situations where the best−fit parameter values are not easily guessed a priori, and where there is a high probability that false minima would be found if one−shot techniques such as POWELL are used instead. Its disadvantages are that it can be slow, and that because of the discrete nature of the search, the global fit−statistic minimum can easily be missed. (The latter disadvantage may be alleviated by combining a grid search with Powell minimization; see GRID−POWELL.)

The user should change the parameter grid.totdim so that its value matches the number of thawed parameters in the fit. When this change is made, the total number of GRID parameters changes, e.g. if the user first changes grid.totdim to 6, the parameters grid.nloop05 and grid.nloop06 will appear, each with default values of 10.

If the Sherpa command FIT is given without changing grid.totdim to match the number of thawed parameters, Sherpa will make the change automatically. However, one cannot change the value of any newly created grid.nloopi parameters until the fit is complete.

If one is interested in running the grid only over a subset of the thawed parameter space, there are two options: first, one can freeze the unimportant parameters at specified values, or second, one can set grid.nloopi for each of the unimportant parameters to 1, while also specifying their (constant) values.

The GRID algorithm uses the specified minimum and maximum values for each thawed parameter to determine the grid points at which the fit statistic is to be evaluated. If grid.nloopi = 1, the grid point is assumed to be the current value of the associated parameter, as indicated above. Otherwise, the grid points for parameter x_i are given by

```
in) , x_(i,min)+[x_(i,max)−x_(i,min)]/[grid.nloopi−1] , x_(i,min)+2[x_(i,max)−x_(i,min)]/[grid.nloopi−1], . .
```

Note that the current parameter value will not be sampled unless the minimum and maximum values, and the

number of grid points, are chosen appropriately.

The maximum number of grid points that may be sampled during one fit is 1.e+7. The total number of grid points is found by taking the product of all values of grid.nloopi.

Parameters

name	type	def	min	max
totdim	integer	4	1	24
nloopi	integer	10	1	1.e+7

Detailed Parameter Descriptions

Parameter=totdim `(integer default=4 min=1 max=24)`

Number of free parameters.

Parameter=nloopi `(integer default=10 min=1 max=1.e+7)`

Number of grid points along axis i. The number of nloopi parameters which the user will actually see after issuing the command SHOW GRID is equal to totdim; the parameter names are nloop01, nloop02, ...

Bugs

See the Sherpa bug pages online for an up−to−date listing of known bugs.

See Also

sherpa

get_method_expr, grid−powell, levenberg−marquardt, method, monte−lm, monte−powell, montecarlo, powell, sigma−rejection, simplex, simul−ann−1, simul−ann−2, simul−pow−1, simul−pow−2, usermethod

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