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

simplex

Context: sherpa

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Synopsis

A simplex optimization method.

Syntax

```
simplex  [iters] [eps] [alpha] [beta] [gamma]
```

Description

The SIMPLEX method is a single−shot method which attempts to find the local fit−statistic minimum nearest to the starting point. Its principal advantage is that it can work well with complicated statistic surfaces (more so than LEVENBERG−MARQUARDT), while also working quickly (more so than POWELL). Its principal disadvantages are that it has a tendency to ``get stuck" in regions with complicated topology before reaching the local fit−statistic minimum, and that there is no guarantee it will find the global fit−statistic minimum. Its tendency to stick means that the user may be best−served by repeating fits until the best−fit point does not change.

A simplex is geometrical form in N−dimensional in parameter space which has N + 1 vertices (e.g., in 3−D it is a tetrahedron). The fit statistic is evaluated for each vertex, and one or more points of the simplex are moved, so that the simplex moves towards the nearest local fit−statistic minimum. When a minimum is reached, the simplex may also contract itself, as an amoeba might; hence, the routine is also sometimes called ``amoeba." Convergence is reached when the simplex settles into a minimum and all the vertices are within some value eps of each other.

The eps parameter controls when the optimization will cease; for SIMPLEX, this will occur when

```
| S_i − S_(i−1) | < eps ,
```

where S_(i−1) and S_i are the observed statistic values for the (i−1)th and ith iteration, respectively.

Parameters

name	type	def	min	max
iters	integer	2000	1	10000
eps	real	1.e−6	1.e−9	0.001
alpha	real	1	0.1	2

beta	real	0.5	0.05	1
gamma	real	2	1.1	20

Detailed Parameter Descriptions

Parameter=iters (integer default=2000 min=1 max=10000)

Maximum number of iterations.

Parameter=eps (real default=1.e−6 min=1.e−9 max=0.001)

Criterion to stop fit.

Parameter=alpha (real default=1 min=0.1 max=2)

Algorithm convergence factor.

Parameter=beta (real default=0.5 min=0.05 max=1)

Algorithm convergence factor.

Parameter=gamma (real default=2 min=1.1 max=20)

Algorithm convergence factor.

Bugs

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

See Also

sherpa

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

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