



AHELP for CIAO 3.4

noise

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Synopsis

Defines an expression to be used for modeling detector noise in source and background datasets.

Syntax

```
sherpa> [B]NOISE [<dataset range> | ALLSETS [ID]] = <modelExpr>
```

NOISE is used for modeling detector noise in source datasets, while BENOISE is used for modeling detector noise in background datasets.

<dataset range> = # (or more generally #:#, #:#, etc.) such that # specifies a dataset number and #:# represents an inclusive range of datasets; one may specify multiple inclusive ranges by separating them with commas. The default dataset is dataset 1. The ID modifier is used only in conjunction with BNOISE, and then if and only if the Sherpa state object variable multiback is set to 1, i.e., if more than one background dataset is to be associated with a single source dataset. The ID modifier may be any unreserved string (e.g., A, foo, etc.), i.e., a string that is not a parsable command.

Description

The model expression, <modelExpr>, is an algebraic combination of one or more of the following elements:

```
{<sherpa_modelname> | <sherpa_modelname>[<modelname>] |  
<modelname> | <model_stack> | <nested_model>}
```

along with numerical values. The following operators are recognized: + - * / () { }. See the CREATE command for further information.

Note that:

- The documentation on Sherpa Models contains a summary list, and descriptions, of the models that are available within Sherpa, which include models from XSPEC, v. 11.3.
- By default, if the model expression includes a model component that has not previously been established, Sherpa will prompt for the initial parameter values for that model component. This prompting can be turned off using the PARAMPROMPT OFF command.

To reset the noise model stack, issue the command:

```
sherpa> [B]NOISE [<dataset range> | ALLSETS] =
```

The NOISE model stack differs from the SOURCE model stack in that after evaluation, the array of noise model amplitudes is not multiplied by the ARF (or by the exposure map in 2D analyses). It is simply added to the ARF-multiplied source model stack amplitudes, and the sum is subsequently folded through the RMF. Components of the NOISE model stack are equivalent to model components in XSPEC to which "/b" has been appended (e.g., lorentz/b).

Example

Define models to be used in the SOURCE and NOISE model stacks:

```
sherpa> INSTRUMENT 2 = RSP[myinst]("data/source.rmf", "data/source.arf")
sherpa> SOURCE 2 = XSWABS[modela]*POWLAW1D[modelb]
sherpa> NOISE 2 = CONST[modelc]
```

This command defines the Sherpa model CONST (a constant) as the detector noise model for dataset number 2. In fits, the SOURCE model stack expression is evaluated, and the resulting array of amplitudes is multiplied by the ARF. Then the NOISE model stack expression is evaluated, with the resulting array of amplitudes added to the ARF-multiplied source array. The summed array is then folded through the RMF.

Bugs

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

See Also

sherpa

[autoest](#), [background](#), [create](#), [create_model](#), [createparamset](#), [fit](#), [freeze](#), [get_defined_models](#), [get_model_params](#), [get_models](#), [get_num_par](#), [get_par](#), [get_stackexpr](#), [getx](#), [gety](#), [guess](#), [instrument](#), [integrate](#), [is_paramset](#), [jointmode](#), [kernel](#), [lineid](#), [linkparam](#), [mdl](#), [modelexpr](#), [modelstack](#), [nestedmodel](#), [paramprompt](#), [paramset](#), [pileup](#), [rename](#), [run_fit](#), [set_par](#), [set_paramset](#), [set_stackexpr](#), [source](#), [thaw](#), [truncate](#), [unlink](#)

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