



AHELP for CIAO 3.4

calc_kcorr

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Synopsis

Calculate the k correction for a spectral model, redshift, and energy range.

Syntax

```
kcorr = calc_kcorr( dnum, z, obslo, obshi );
kcorr = calc_kcorr( dnum, z, obslo, obshi, restlo, resthi );
```

Description

The routine is loaded into Sherpa with the call

```
require ("sherpa_utils");
```

calc_kcorr(dnum,z,obslo,obshi)

Calculates the k correction for the model spectrum associated with dataset number dnum (an integer ≥ 1) when at redshift z for the energy range obslo to obshi. The energy range is taken to be

```
obslo <= energy < obshi
```

with the energies being in keV.

The redshift (z) parameter can be a scalar or a 1-D array; the return value matches that of z. If it is an array then the k correction will be evaluated for each redshift in the array.

If any component of the source model has a redshift parameter then it should be set to 0 before calling this routine.

See the ["Calculating k-corrections" thread](#) for more information on this function.

calc_kcorr(dnum,z,obslo,obshi,restlo,resthi)

As the previous version of calc_kcorr() but this time we calculate the k correction from the observed energy range obslo to obshi to the rest frame energy range restlo to resthi.

Example 1

```
sherpa> paramprompt off
Model parameter prompting is off
sherpa> source = xsmekal[clus]
sherpa> set_datspace(1,0.01,10,0.01)
sherpa> calc_kcorr(1,0.5,0.5,2)
1.06175
sherpa> calc_kcorr(1,0.5,0.5,2,2,10)
0.113007
```

Here we set up a source model called `clus` which uses the `XSMEKAL` model for dataset number 1. The parameter values are not prompted for and so left at their default values (it is important that the redshift parameter of the model is left at 0). The `set_datspace()` command is used to set the X-axis for the model to be 0.01 to 10 keV with a grid step of 0.01 keV.

The `calc_kcorr()` routine is then used to calculate the k correction if the source were at a redshift of 0.5 for two cases:

- for the 0.5–2.0 keV band
- to convert from the observed 0.5–2.0 keV band to the rest-frame 2–10 keV band

Example 2

```
sherpa> sherpa.modeloverride = 1
sherpa> paramprompt off
Model parameter prompting is off
sherpa> source = xsmekal[clus]
sherpa> clus.kt = 6
sherpa> clus.abund = 0.3
sherpa> set_datspace(1,0.01,10,0.01)
sherpa> calc_kcorr(1,0.5,0.5,2)
0.824037
sherpa> set_datspace(1,0.01,10,0.1)
sherpa> calc_kcorr(1,0.5,0.5,2)
0.800428
```

Here we use the same model as in the previous example but change the `kt` parameter to 6 keV and the `Abund` parameter to 0.3 before calculating the k corrections.

The 0.5–2.0 keV correction factor for a source at redshift 0.5 is calculated – the difference in parameter values of the model lead to a smaller k-correction value. The grid size of the dataspace is then changed from 0.01 to 0.1 keV and the k correction re-calculated to highlight that the correction is dependent on the grid size.

Example 3

```
sherpa> sherpa.modeloverride = 1
sherpa> paramprompt off
Model parameter prompting is off
sherpa> source = xsmekal[clus]
sherpa> clus.kt = 6
sherpa> clus.abund = 0.3
sherpa> set_datspace(1,0.01,10,0.01)
sherpa> calc_kcorr(1,0.5,0.5,2)
0.824037
```

```
sherpa> clus.kt = 10
sherpa> calc_kcorr(1,0.5,0.5,2)
0.788313
sherpa> clus.kt = 4
sherpa> calc_kcorr(1,0.5,0.5,2)
0.866314
```

Here we show the k correction being calculated for three different temperatures: 6, 10, and 4 keV.

NOTES

Please see "ahelp sherpa_utils" for information on how to load these routines into Sherpa.

See Also

chandra

[guide](#)

sherpa

[bye](#), [dataspace](#), [dcounts](#), [dollarsign](#), [echo](#), [eflux](#), [eqwidth](#), [erase](#), [flux](#), [get](#), [get dcounts sum](#), [get dir](#), [get eflux](#), [get eqwidth](#), [get filename](#), [get flux2d](#), [get flux str](#), [get lfactorial](#), [get mcounts sum](#), [get pflux](#), [get source components](#), [get verbose](#), [groupbycounts](#), [guess](#), [is](#), [journal](#), [list](#), [list par](#), [mcounts](#), [numbersign](#), [paramest](#), [plot eprof](#), [plot rprof](#), [prompt](#), [reset](#), [run](#), [set](#), [set analysis](#), [set axes](#), [set coord](#), [set dataspace](#), [set dir](#), [set verbose](#), [setplot](#), [sherpa-module](#), [sherpa plotfns](#), [sherpa utils](#), [show](#), [simspec](#), [use](#), [version](#)

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URL:
http://cxc.harvard.edu/ciao3.4/calc_kcorr.html
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