ctools - Change request #1547

ctbkgcube should set parameter boundaries of output model

10/07/2015 02:23 PM - Mayer Michael

Status:	Closed	**Start date:**	10/07/2015
Priority:	Normal	**Due date:**	
Assigned To:	Knödlseder Jürgen	**% Done:**	100%
Category:		**Estimated time:**	0.00 hour
Target version:	1.0.0		

Description

I realised that in some analyses, we have convergence problems when the parameters are not properly constrained.
Running ctbkgcube, the output background model parameter Prefactor is limited to [0.0; infty[.
The problem occurs e.g. in csspec in binned mode (all curvatures are zero for some energy bins). Limiting the Prefactor to [0.01;100] solved the problem.
I therefore propose to change the following lines in ctbkgcube:

```
GModelSpectralPlaw      spectral(1.0, 0.0, GEnergy(1.0, "TeV"));
GCTAModelCubeBackground model(spectral);
```

to

```
GModelSpectralPlaw      spectral(1.0, 0.0, GEnergy(1.0, "TeV"));
spectral["Prefactor"].min(0.01);
spectral["Prefactor"].max(100.0);
GCTAModelCubeBackground model(spectral);
```

History

#1 - 10/09/2015 11:03 AM - Knödlseder Jürgen

Agree to constrain the parameters. Note that there is range method that allows to set both boundaries at once, i.e.

spectral["Prefactor"].range(0.01, 100.0);

We might also constrain the index to some plausible values, for example [-1.0, 1.0], but we should probably check first that this does not create any problem.

#2 - 10/09/2015 11:10 AM - Mayer Michael

Even better to use the range method. The index is currently constrained to [-10,10] which of course is a large range. I agree that further constraining might be good and I guess [-1,1] should be fine here. To be careful we could however think about [-5,5]?

#3 - 10/09/2015 11:11 AM - Knödlseder Jürgen

Also fine. I was not aware that the index was already constrained. Whatever fit your needs should be fine, we can always revise this later when we have more experience with it.

#4 - 10/09/2015 11:20 AM - Mayer Michael

I guess in order not to break someones analysis, we could use [-5.0,5.0]. This range should still be appropriate to fit indices around 0.0.

> I was not aware that the index was already constrained.

This happens on construction in GModelSpectralPlaw::init_members().

#5 - 10/09/2015 11:27 AM - Knödlseder Jürgen

Mayer Michael wrote:

> I guess in order not to break someones analysis, we could use [-5.0,5.0]. This range should still be appropriate to fit indices around 0.0.
>
> > I was not aware that the index was already constrained.
>
> This happens on construction in GModelSpectralPlaw::init_members().

biggrin.png should remember better what I have coded ...

#6 - 10/09/2015 04:49 PM - Mayer Michael

smile.png
Should I create a branch, or do you implement this right away?

#7 - 10/12/2015 03:11 PM - Knödlseder Jürgen

- Status changed from New to Closed

- Assigned To set to Knödlseder Jürgen

- Target version set to 1.0.0

- % Done changed from 0 to 100

Just implemented the change (is in devel).