

## ctools - Change request #1547

### ctbkgcube should set parameter boundaries of output model

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

<b>Status:</b>	Closed	<b>Start date:</b>	10/07/2015
<b>Priority:</b>	Normal	<b>Due date:</b>	
<b>Assigned To:</b>	Knödseder Jürgen	<b>% Done:</b>	100%
<b>Category:</b>		<b>Estimated time:</b>	0.00 hour
<b>Target version:</b>	1.0.0		
<b>Description</b>			
<p>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; infity]. 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.</p> <p>I therefore propose to change the following lines in ctbkgcube:</p> <pre>GModelSpectralPlaw spectral(1.0, 0.0, GEnergy(1.0, "TeV")); GCTAModelCubeBackground model(spectral);</pre> <p>to</p> <pre>GModelSpectralPlaw spectral(1.0, 0.0, GEnergy(1.0, "TeV")); spectral["Prefactor"].min(0.01); spectral["Prefactor"].max(100.0); GCTAModelCubeBackground model(spectral);</pre>			

#### History

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

- Status changed from New to Closed
- Assigned To set to Knödseder Jürgen
- Target version set to 1.0.0
- % Done changed from 0 to 100

Just implemented the change (is in devel).