

GammaLib - Feature #599

Add spectral table model à la XSPEC

11/27/2012 02:47 PM - Knödlseider Jürgen

Status:	Closed	Start date:	
Priority:	High	Due date:	
Assigned To:	Knödlseider Jürgen	% Done:	100%
Category:		Estimated time:	0.00 hour
Target version:	1.7.0		
Description			
The XSPEC package allows spectral models to be defined using a FITS table. Code should be added to GammaLib to support this format. This would then allow inclusion of XSPEC table models in GammaLib analyses.			
See http://heasarc.gsfc.nasa.gov/docs/heasarc/ofwg/docs/general/ogip_92_009/ogip_92_009.html for more information on XSPEC table models.			

History

#1 - 11/27/2012 02:48 PM - Knödlseider Jürgen

- Description updated

#2 - 12/11/2013 09:34 PM - Knödlseider Jürgen

- Target version set to 2nd coding sprint

#3 - 02/17/2014 10:22 PM - Knödlseider Jürgen

- Target version deleted (2nd coding sprint)

#4 - 07/08/2019 10:57 AM - Knödlseider Jürgen

- Priority changed from Normal to High

- Target version set to 1.7.0

#5 - 11/25/2019 09:32 PM - Knödlseider Jürgen

- Status changed from New to In Progress

- Assigned To set to Knödlseider Jürgen

- % Done changed from 0 to 10

I added the classes GModelSpectralTablePar and GModelSpectralTablePars to handle table model parameters.

The class GModelSpectralTablePar implements a structure that combines a model parameter GModelPar with a list of values that represent the values at which the parameter is evaluated.

The class GModelSpectralTablePars is a container class that combines the relevant parameters for a given table model.

#6 - 11/26/2019 02:53 PM - Knödlseider Jürgen

- % Done changed from 10 to 30

I started implementing a GModelSpectralTable class that handles table model in the XSPEC format.

For the moment the class supports creating of table models, saving them into a FITS file and reloading the models from the FITS file.

#7 - 06/23/2020 04:24 PM - Knödseder Jürgen

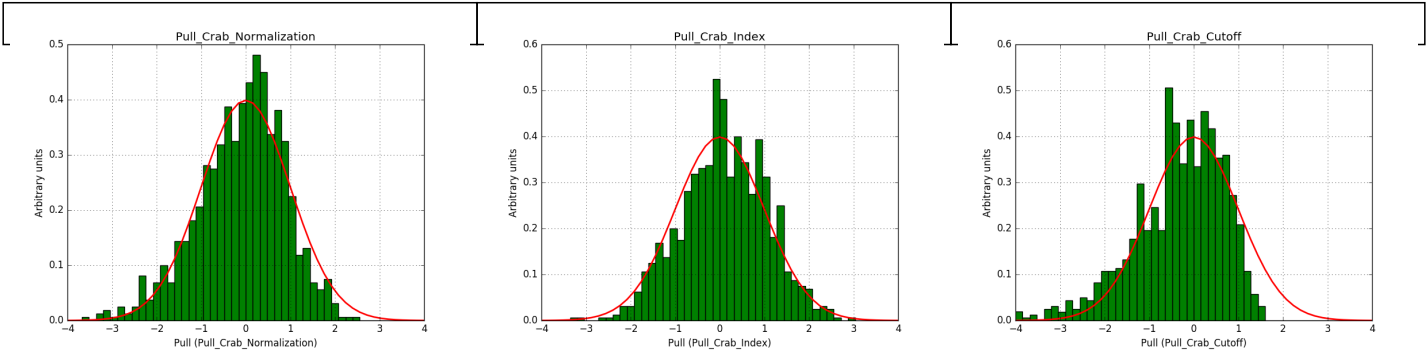
- File test.py added
- File Normalization_100_50_50.png added
- File Index_100_50_50.png added
- File Cutoff_100_50_50.png added
- % Done changed from 30 to 80

I completed the implementation of the GModelSpectralTable class. I did some tests using the following script: attachment:test.py. The script generates a table model using an exponentially cutoff power law. The script generates spectral vectors with 50 energy bins for the energy range 10 GeV - 300 TeV. The spectral index is varied between -1 and -3 with a step size of 0.02, the cutoff energy is varied from 0.1 TeV to 28 TeV using a logarithmic spacing. **Note, however, that for the moment the parameters are interpolated linearly.**

The script checks also the results of the flux and eflux methods:

Method	GModelSpectralExpPlaw	GModelSpectralTable
flux()	650290.728691	649713.700728
eflux()	262858.068641	262396.532449

Finally, I created a pull distribution with 1000 trials for the table model, below the normalisation, index and cutoff pull histograms.



#8 - 06/23/2020 06:05 PM - Knödseder Jürgen

- Status changed from In Progress to Closed
- % Done changed from 80 to 100

Merged into devel.

Files

test.py	3.93 KB	06/23/2020	Knödseder Jürgen
Normalization_100_50_50.png	42 KB	06/23/2020	Knödseder Jürgen
Index_100_50_50.png	39.4 KB	06/23/2020	Knödseder Jürgen
Cutoff_100_50_50.png	39.9 KB	06/23/2020	Knödseder Jürgen