

## GammaLib - Bug #1142

### Pull distribution of CTA RadialAcceptance model shows offset in Normalization

02/09/2014 10:52 PM - Knödlseider Jürgen

<b>Status:</b>	Closed	<b>Start date:</b>	02/09/2014
<b>Priority:</b>	High	<b>Due date:</b>	
<b>Assigned To:</b>	Knödlseider Jürgen	<b>% Done:</b>	100%
<b>Category:</b>		<b>Estimated time:</b>	0.00 hour
<b>Target version:</b>	00-09-00		
<b>Description</b>			
Everything is in the title. Plots will be posted later.			

#### History

##### #1 - 02/10/2014 02:57 PM - Knödlseider Jürgen

- Status changed from New to In Progress

- % Done changed from 0 to 80

It appears that the integration precision of  $1e-5$  in `GObservation::npred_spec` was not enough for the highly erratic background model file function. Increasing the precision to  $1e-6$  is not perfect, but results in a pull distribution that is much more close to a Gaussian.

Here as example the `Npred` dependence on the integration precision. Using a dumb numerical integration, a value of 1017061.8 is expected:

Precision	Npred	Absolute difference	Relative difference
$1e-5$	1016370.3	-691.5	-0.07%
$1e-6$	1017138.6	76.8	+0.008%
$1e-7$	1017059.2	-2.6	-0.0003%
$1e-8$	1017062.1	0.3	0.00003%

So even with  $1e-5$  the relative difference is small, but when a long run and the background model is concerned, such a value may be perceptible.

##### #2 - 02/10/2014 03:15 PM - Knödlseider Jürgen

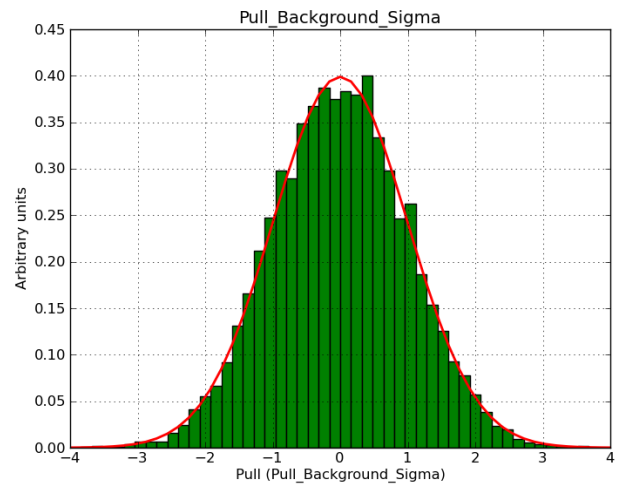
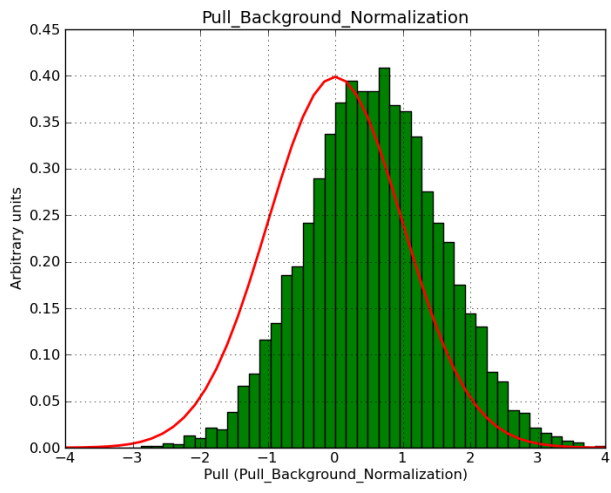
- File `background_normalization_problem.png` added

- File `background_sigma_problem.png` added

- File `model_bgd.xml` added

Below the pull distributions for `gammalib-00-08-01`. The background normalization is obviously systematically shifted towards too high values. The XML file for this simulation can be found here: `attachment:model_bgd.xml`. The deadtime correction factor has been set to 1 to make sure that the problem is not related to the deadtime correction.

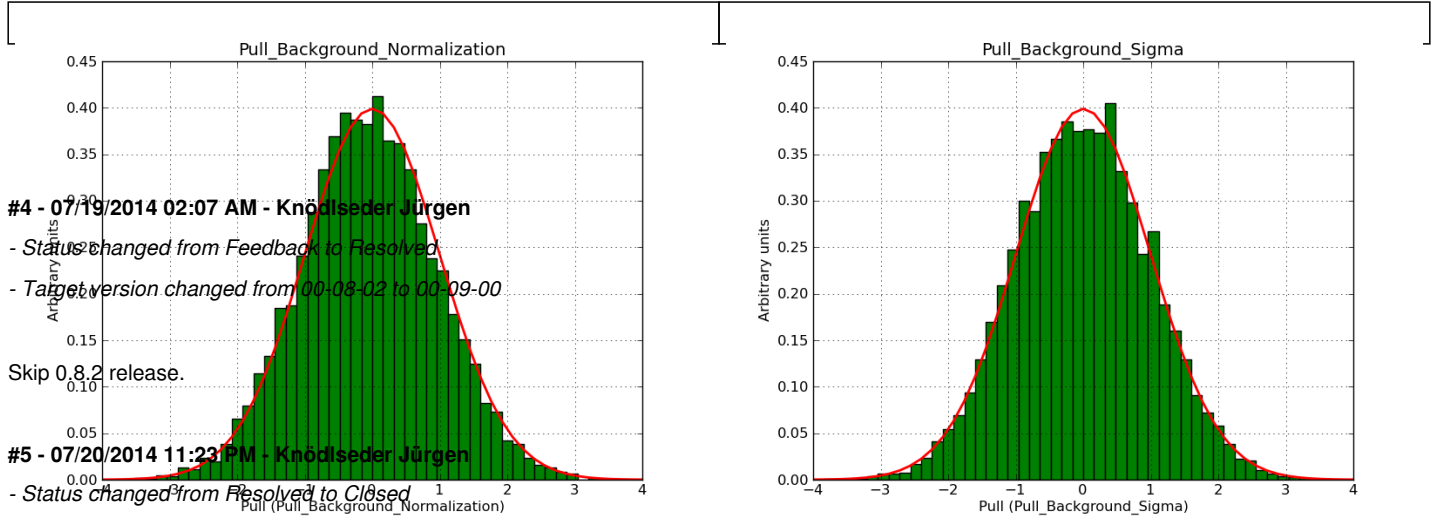
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**#3 - 02/12/2014 09:38 PM - Knödseder Jürgen**

- File `background_normalization_solved.png` added
- File `background_sigma_solved.png` added
- Status changed from *In Progress* to *Feedback*
- % Done changed from 80 to 100

Below the pull distributions for an integration precision of 1e-6. This obviously fixes the problem, at the expense of a moderate increase in computing time.



**Files**

<code>background_normalization_problem.png</code>	47.9 KB	02/10/2014	Knödseder Jürgen
<code>background_sigma_problem.png</code>	46.4 KB	02/10/2014	Knödseder Jürgen
<code>model_bgd.xml</code>	510 Bytes	02/10/2014	Knödseder Jürgen
<code>background_normalization_solved.png</code>	47.8 KB	02/12/2014	Knödseder Jürgen
<code>background_sigma_solved.png</code>	46.5 KB	02/12/2014	Knödseder Jürgen