

GammaLib - Feature #1916

Add GModelTemporalPhaseCurve class

01/27/2017 09:58 AM - Knödlseeder Jürgen

Status:	Closed	Start date:	01/27/2017
Priority:	Normal	Due date:	
Assigned To:	Knödlseeder Jürgen	% Done:	100%
Category:		Estimated time:	0.00 hour
Target version:	1.2.0		

Description

The GModelTemporalPhase class should implement a regular variation, specified by a phase file function (relative amplitude as function of phase in the interval $[0,1)$). The class can be used to simulate pulsars and gamma-ray binaries. Parameters of the model component are:

- the relative normalization
- the origin of time (t_0)
- the period at time t_0 (p_0)
- the first period derivative at time t_0 (p_1)
- the second period derivative at time t_0 (p_2)
- the phase at the origin of time at time t_0 (ϕ_0)

The phase is computed using

$$\{\{\text{latex}(\Phi(t) = \Phi_0 + f(t-t_0) + \frac{1}{2}\dot{f}(t-t_0)^2 + \frac{1}{6}\ddot{f}(t-t_0)^3)\}\}$$

where

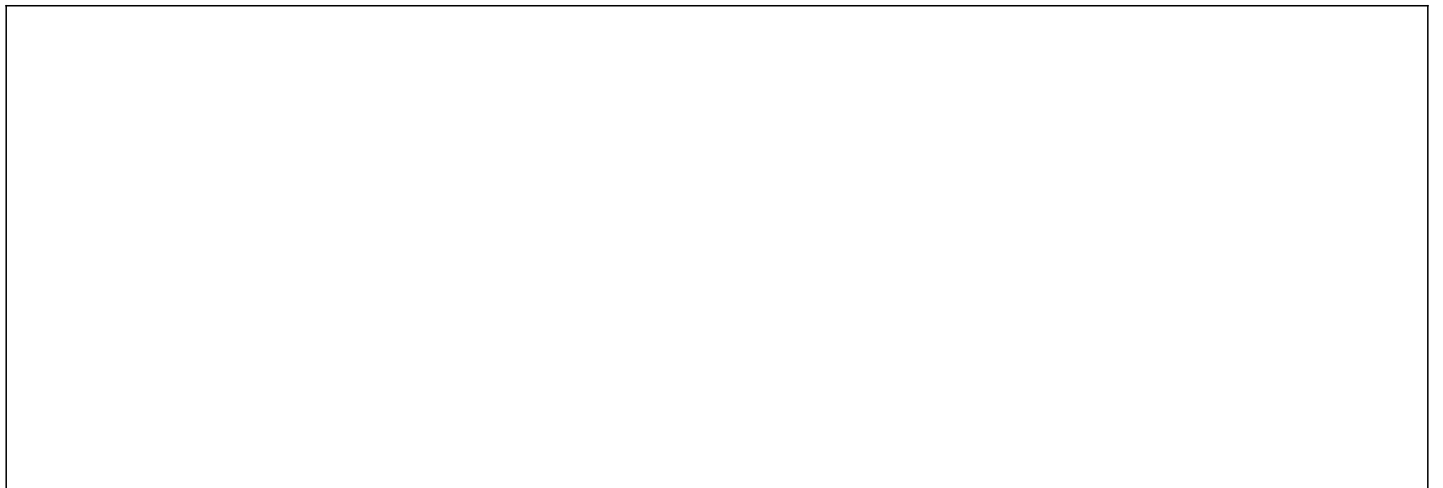
- $\{\{\text{latex}(\dot{f} = \frac{1}{P})\}\}$
- $\{\{\text{latex}(\dot{f} = -\frac{\dot{P}}{P^2})\}\}$
- $\{\{\text{latex}(\ddot{f} = \frac{\dot{P}^2}{P^3} - \frac{\ddot{P}}{P^2})\}\}$

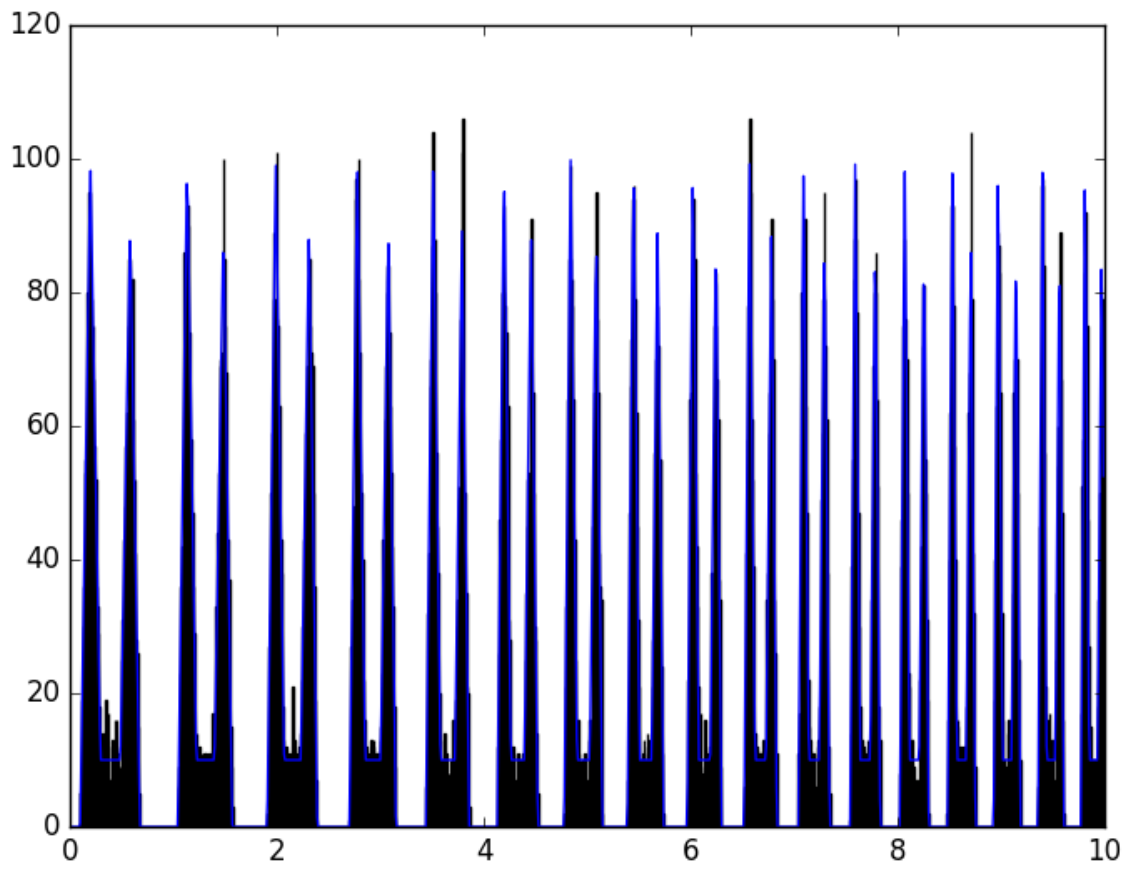
History

#1 - 01/27/2017 10:43 PM - Knödlseeder Jürgen

- File *phasecurve.png* added
- Subject changed from *Add GModelTemporalPhase class* to *Add GModelTemporalPhaseCurve class*
- Status changed from *New* to *In Progress*
- Assigned To set to *Knödlseeder Jürgen*
- Target version set to *1.2.0*
- % Done changed from *0* to *80*

The class is now correctly implemented (see plot below).



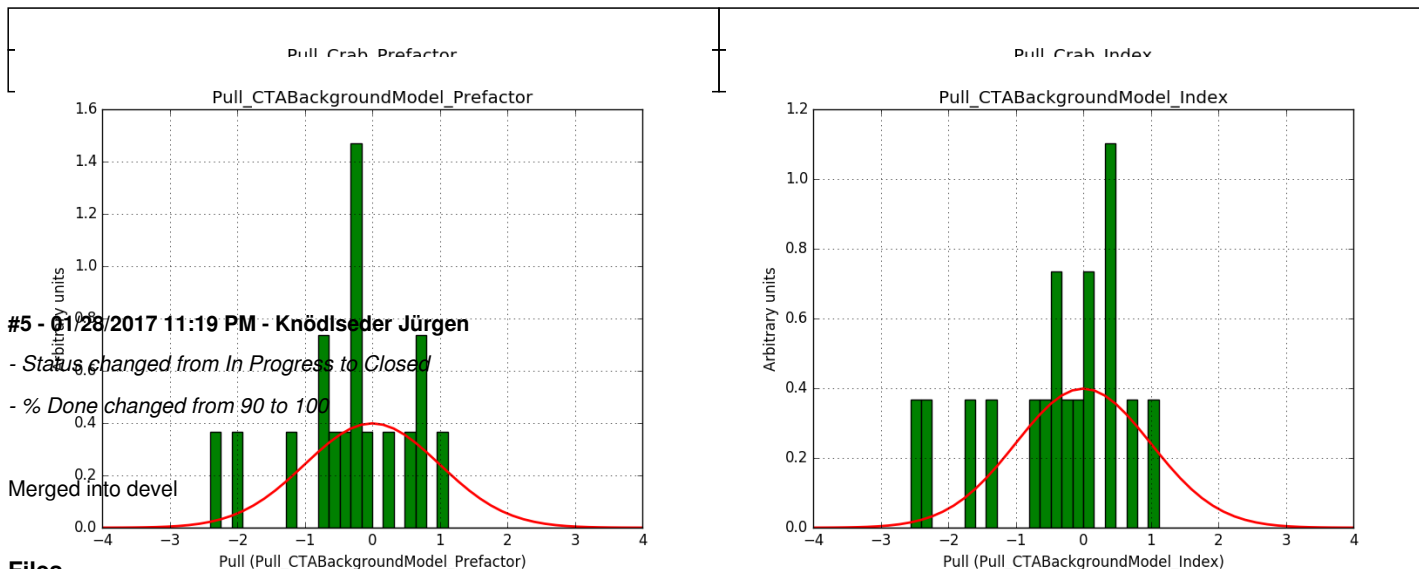


2017-01-27T22:12:18: Number of spectral par's ...: 3
 2017-01-27T22:12:18: Prefactor: 0.997595111690758 +/- 0.0118966498258124 [0.001,1000] ph/cm2/s/MeV (free,scale=1,gradient)
 2017-01-27T22:12:18: Index: -0.00052776545878647 +/- 0.00735258326140023 [-5,5] (free,scale=1,gradient)
 2017-01-27T22:12:18: PivotEnergy: 1000000 [10000,1000000000] MeV (fixed,scale=1000000,gradient)
 2017-01-27T22:12:18: Number of temporal par's ...: 1
 2017-01-27T22:12:18: Normalization: 1 (relative value) (fixed,scale=1,gradient)

#4 - 01/28/2017 11:03 PM - Knödseder Jürgen

- File *bgd_index.png* added
- File *bgd_prefactor.png* added
- File *prefactor.png* added
- File *index.png* added

Here the pull distributions for fitting with fixed phase parameters. Note that fitting the phase parameters leads to warnings and the fit seems not to work properly, but it would have been a surprise if this were possible. This needs some more investigations, an issue has been created for that: #1917.



#5 - 01/28/2017 11:19 PM - Knödseder Jürgen

- Status changed from *In Progress* to *Closed*
- % Done changed from 90 to 100

Merged into devel

Files

phasecurve.png	63 KB	01/27/2017	Knödseder Jürgen
ctobssim.png	15.8 KB	01/27/2017	Knödseder Jürgen
bgd_index.png	40.3 KB	01/28/2017	Knödseder Jürgen
bgd_prefactor.png	42 KB	01/28/2017	Knödseder Jürgen
prefactor.png	39.6 KB	01/28/2017	Knödseder Jürgen
index.png	30.4 KB	01/28/2017	Knödseder Jürgen