

ctools - Support #2658

Negative -logL

08/02/2018 11:03 AM - Malyshev Denys

Status:	Closed	Start date:	08/02/2018
Priority:	Normal	Due date:	
Assigned To:		% Done:	100%
Category:		Estimated time:	0.00 hour
Target version:			

Description

In some cases for Fermi/LAT data analysis ctlike reports negative -logL values which are decreasing further during the optimization. Since logL is a sum of non-positive log-probabilities, -logL can not take negative values.

The issue seems to be present only for a long (e.g. whole 10 years of Fermi/LAT data) datasets, for short periods -logL is positive. Please, find minimal working example reproducing the problem at

<https://www.dropbox.com/s/qyge5k79lmu1e18/negativeLL.tgz?dl=0>

(please link also standard fermi/lat galactic diffuse background model to downloaded folder as glprp.fits)

I've also attached corresponding ctlike.log file to this issue.

Maybe the problem is related to the bug #1869.

The problem might also not be real and related just to an output format for log-like, which exceeds some value for a long dataset.

History

#1 - 08/02/2018 12:43 PM - Knödseder Jürgen

- *Tracker changed from Bug to Support*

This is not a bug but a feature. In fact the factorial term is not included in the logL since it's a constant and would only eat up computation time. Therefore the value can be positive or negative.

See our article for the full mathematics: <https://www.aanda.org/articles/aa/abs/2016/09/aa28822-16/aa28822-16.html>, specifically equations (1) and (3).

#2 - 08/02/2018 01:03 PM - Malyshev Denys

Ah, I see. Thanks, Jurgen!

#3 - 08/02/2018 04:52 PM - Knödseder Jürgen

- *Status changed from New to Closed*

- *% Done changed from 0 to 100*