

Total number of counts computed by ctmodel depends on number of energy bins

11/19/2019 04:51 PM - Specovius Andreas

Status:	Closed	Start date:	11/19/2019
Priority:	High	Due date:	
Assigned To:		% Done:	0%
Category:		Estimated time:	0.00 hour
Target version:			

Description

I observed that the total number of counts in a given energy range computed by ctmodel depends on the number of energy bins (or the other way around - on the bin sizes themselves?).

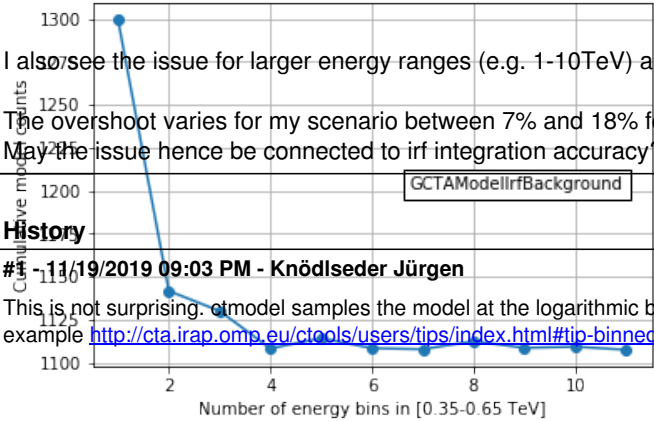
I stumbled about it when computing a model map for the energy range of 350-650 GeV using irf background. Computing the model counts with enumbins=1 yielded a total number of counts which was ~18% higher than the one obtained by subdividing the same energy range into sub bins (e.g. with enumbins=3) and stacking along the energy axis.

The attached figure shows the described behavior, exemplarily for a single observation of my use case.

I also see the issue for larger energy ranges (e.g. 1-10TeV) and effective area background (but less dominant).

The overshoot varies for my scenario between 7% and 18% for different individual observations.

May the issue hence be connected to irf integration accuracy?



History

#1 - 11/19/2019 09:03 PM - Knödseder Jürgen

This is not surprising. ctmodel samples the model at the logarithmic bin centre, hence with a fine sampling things become more accurate. See for example <http://cta.irap.omp.eu/ctools/users/tips/index.html#tip-binned>.

#2 - 11/20/2019 10:44 AM - Specovius Andreas

- Tracker changed from Bug to Support
- Status changed from New to Resolved

Choosing apriori multiple sub-bins was a bit unintuitive as I wanted to have a single energy bin in the end but of course, you are totally right! Thank you for your quick reply!

Set the tracker to Support because there was no bug.

#3 - 01/28/2020 10:10 AM - Knödseder Jürgen

- Status changed from Resolved to Closed

Files			
ctmodel_different_nebins.png	15.3 KB	11/19/2019	Specovius Andreas