

Q & A (Monday, June 28 2021)

Q. By 5 sigma, are we getting that from sqrt(25)? Sorry I don't think I understood?

A. The square root of the TS is approximately equal to the detection significance for a given source.

Q. How can you know which is the best number of bins per data? And how many photons per bin? Does the number of counts per bin matter in binned likelihood analysis? Is there a threshold where a statistical analysis falls apart?

A. As a general rule, the FSSC recommends 10 energy bins per decade of energy in the energy range. An unbinned analysis is recommended when the number of events in each bin is expected to be small e.g. faint sources, short time series

Q. What would be a deemed a 'good' TS value for your source?

A. A TS > 25 is probably a good lower limit. Anything below that should be treated very carefully.

Q. How can we work around having a very bright source near the source we are observing?

The spectral fit can be significantly affected if bright sources are not properly modelled. If the bright source is steady that takes away the variability factor and modelling different time intervals can provide sanity checks to verify the fit. For nearby bright variable sources, one might need to free more parameters in the input model and iterate a few times to reach convergence.

Q. What is the nested model?

A. By nested model we mean situations when one model is a special case of another i.e. the more complex model can be transformed into the simpler model. The likelihood-ratio test requires the models be nested.

Q. What do you mean by signal strength?

A. One might think of signal strength as the contribution from the source that one is trying to measure. Ultimately, an actual detection depends on the signal strength compared to the noise level or signal-to-noise ratio.