

REPORT ON JINST_042P_1214

DATE: MARCH 5, 2015

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TITLE: Handling uncertainties in background shapes: the discrete profiling me

RECEIVED: 2014-12-25 20:59:59.0

Referee report

The current version of the paper includes important modifications compared to the initial draft, which significantly improve the text and almost completely address the issues mentioned in the previous round. A few second-order comments can be found below, following the same numbering as in the initial report (the points not mentioned are considered resolved).

1) The additional figures address most of the original point. One minor further comment is that in the newly-added Fig. 5, all the "different functions" are grouped together, including the Laurent form which is shown elsewhere to give fits that are almost identical to the power-law form used for generation. For this reason the agreement between the "same function" (i.e. power-law) and "different function" curves is perhaps not so surprising, if the Laurent form dominates the latter. The argument would therefore be more powerful if the distributions for each of the functional forms (Laurent, exponential, and linear) were shown separately – or at least separating out the Laurent form from the rest. (this obviously would not apply in the same way to Fig. 13 due to the much larger set of other functions considered in this case)

2) The answer given by the authors clarifies the issue. Having this explanation more explicitly spelled out in the paper itself would be welcome, but I

leave this to the editors' decision.

4) The presentation of the results in terms of Z-score is an elegant solution to this issue. A trivial residual comment is that the explanatory footnote does not seem completely clear, as the phrase "These correspond to the areas..." appears to refer to the Z-scores, rather than the frequencies mentioned earlier. Also the footnote comes a bit late (probably due to a typesetting issue?), and could be misconstrued to refer to the "expected values".

Due to the minor nature of these comments, the paper could be published either as it stands or with the minor revisions suggested above.