Thesis

Tomas Kontrimas

2024-09-06

Table of contents

Preface **4**

Abstract **5**

Zusammenfassung **6**

1 Introduction **7**
1.1 Test section 7

2 Cosmic particles **8**

3 The IceCube Neutrino Observatory **9**

4 Software Packages **10**
4.1 skyllh 10
4.1.1 stacking 10
4.1.2 Seyfert Flux 10
4.2 p1skyllh 10
4.3 icetray 10
4.3.1 ml_suite 10
4.3.2 photospline 10

5 Improved Point Source Analysis **11**
5.1 PS likelihood 11
5.2 observables reconstruction 11
5.3 KDE 11
5.4 PS methods, skyscan, catalog search, binomial test 11
5.5 performance plots. Biases, sens, dp 11
5.6 results 11

6 Seyferts **12**
6.1 seyfert neutrino connection 12
6.2 core-corona model 12

6.3 BASS catalog 12
6.3.1 swift 12
6.3.2 nustar? 12
6.4 PS methods, stacking 12
6.5 performance plots. Biases, sens, dp 12
6.6 results 12

7 Extended Point Source Analysis **13**
7.1 IC79 subselection 13
7.2 skykde tool 13
7.3 performance plots. Biases, sens, dp 13
7.4 Results 13
7.5 Future work 13
7.5.1 normalizing flows 13
7.5.2 likelihood free inference 13

8 Conclusion **14**

9 Acknowledgements **15**

References **16**

Preface

This is a Quarto book.

To learn more about Quarto books visit https://quarto.org/docs/books.

blablabla

bal

We know from *the first fundamental theorem of calculus* that for x in $[a, b]$:

$$\frac{d}{dx}\left(\int_a^x f(u)\,du\right) = f(x).$$

Abstract

Zusammenfassung

1 Introduction

This is a book created from markdown and executable code.

See Knuth (1984) for additional discussion of literate programming.

1.1 Test section

text

2 Cosmic particles

3 The IceCube Neutrino Observatory

4 Software Packages

4.1 skyllh

4.1.1 stacking

4.1.2 Seyfert Flux

4.2 p1skyllh

4.3 icetray

4.3.1 ml_suite

4.3.2 photospline

5 Improved Point Source Analysis

5.1 PS likelihood

5.2 observables reconstruction

5.3 KDE

5.4 PS methods, skyscan, catalog search, binomial test

5.5 performance plots. Biases, sens, dp

5.6 results

6 Seyferts

6.1 seyfert neutrino connection

6.2 core-corona model

6.3 BASS catalog

6.3.1 swift

6.3.2 nustar?

6.4 PS methods, stacking

6.5 performance plots. Biases, sens, dp

6.6 results

7 Extended Point Source Analysis

7.1 IC79 subselection

7.2 skykde tool

7.3 performance plots. Biases, sens, dp

7.4 Results

7.5 Future work

7.5.1 normalizing flows

7.5.2 likelihood free inference

8 Conclusion

9 Acknowledgements

References

Knuth, Donald E. 1984. “Literate Programming.” *Comput. J.* 27 (2): 97–111. https://doi.org/10.1093/comjnl/27.2.97.