Statistical Methods in Experimental Physics

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This lab report introduces Gaussian error propagation (GEP), least squares fitting (LSF), maximum likelihood estimation (MLE), and Bayesian parameter estimation (BPE). We first derive their theoretical foundations and then exemplify their usage by way of a toy model. In particular we use SymPy to perform symbolic error propagation (GEP), we fit a third degree polynomial to data (LSF), we estimate the mean lifetime (MLE) and branching ratio (BPE) of a decay.

1 Introduction

2 Tasks

3 Conclusion