

# Sign SGD with Heavy-Tailed Noise and Differential Privacy

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## Abstract

For now, see separate file for it.

## 1 Introduction

In the recent work **kornilov2025**, the authors have shown that Sign-SGD with heavy-tailed noise achieves optimal convergence rates under certain assumptions. Additionally, **Jin2021** demonstrated that Sign-SGD can be made differentially private while maintaining good convergence properties.

## 2 Theory

Present your theoretical framework, definitions, lemmas, and proofs.

## 3 Experiments

Describe your experimental setup, methodology, and results.

## 4 Conclusion

Summarize your findings and discuss future work.

## Acknowledgments

Optional acknowledgments section.

## **A Additional Proofs and Results**

Include detailed proofs and supplementary materials here.