Sign operator for (L_0, L_1)-smooth Optimization

Optimization with sparsity constraints is challenging yet crucial for modern applications.
This work introduces a novel approach to tackle these challenges efficiently.

The problem

to investigate optimization under (L_0, L_1)-smoothness assumption with heavy-tailed noise

Sign-(L_0, L_1) Method

leverages the sign function for robust gradient updates

The solution

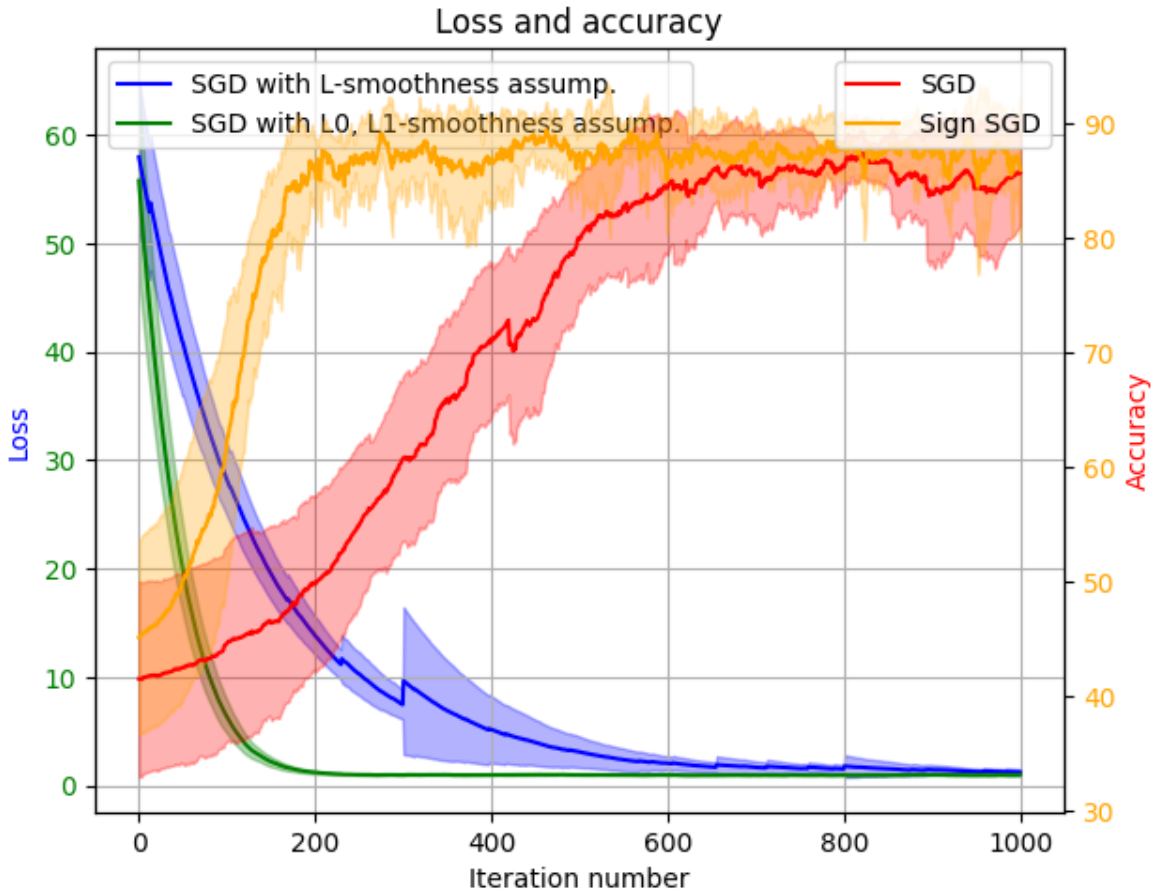
our results promise faster convergence and contribute to sparse solutions

1) set the problem with (L_0, L_1) and HT-noise conditions,
2) put the sign function to handle noisy gradients,
3) get improved bounds for convergence.

Graphical Highlights of Sign-(L_0, L_1)

Convergence rates improve significantly with Sign-(L_0, L_1) with HT-noise compared to baseline.

$\|\nabla^2 f(x)\|_2 \leq L_0 + L_1\|\nabla f(x)\|$,
Subjects:
Sign-based methods, (L_0, L_1)-smoothness, high-probability convergence, heavy-tailed noise.



Methods can be applied to problems with HT-noise and high communication costs.