First order methods in two-layer neural networks optimization

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Abstract

We investigate the extents and limits of first order methods optimization algorithms when training two-layer neural networks for a finite number of time steps. We characterize rigorously the class of functions that can be learned efficiently from two-layer networks with a finite number of iterations from a general first order algorithms. We corroborate the claims with extensive numerical simulations.

Keywords: Gradient descent, neural networks, optimization.

1. Introduction

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- Limit the main text (not counting references and appendices) to 12 PMLR-formatted pages, using this template. Please add any additional appendix to the same file after references - there is no page limit for the appendix.

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Appendix A. My Proof of Theorem 1

This is a boring technical proof.

Appendix B. My Proof of Theorem 2

This is a complete version of a proof sketched in the main text.