

Einladung

Würzburger Mathematisches Kolloquium

Julius-Maximilians-Universität Würzburg • Institut für Mathematik

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From Multilevel Optimization to Deep Learning

Dienstag, 12. Juli 2022 • 14:15 Uhr

Seminarraum SE40 • Mathematik Ost (Emil-Fischer-Straße 40, 97074 Würzburg)

Der Vortrag wird auch Zoom-Meeting übertragen: go.uni-wue.de/ifmcolloquium-zoom

Abstract. Deep residual networks are nowadays widely used in many different application areas, such as classification, translation, or statistical learning, and have become part of our daily lives. Before a neural network can be employed, however, it needs to be trained. During this training process, certain parameters of the network, the weights, and biases, are determined. Mathematically speaking, training means the minimization of a usually non-convex function, the so-called loss function. This minimization procedure is typically performed using variants of the stochastic gradient (SGD) method, which constructs search directions using a stochastic gradient estimator. Although these methods have a low computational cost per iteration, their convergence properties depend on the size of the network itself. The larger -or, the more accurate- the network, the longer the training will take. In fact, training times of days or weeks are not uncommon.

Thus, it seems natural to look for an alternative to classical training methods for neural networks. In this talk, we present a multilevel training strategy, which transfers ideas from highly efficient solution methods for large-scale (non-)linear problems to the training of neural networks. We will explain the philosophy underlying our method and will sketch the mathematical principles of its realization. As it turns out, our training approach is intimately coupled to the 'deep' structure of the network in terms of layers. We will comment on these connections and will present examples, showing how our method performs for different state-of-the-art training problems.



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Alle sind herzlich eingeladen.

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