



DIPARTIMENTO DI FISICA E ASTRONOMIA
"Galileo Galilei" – DFA

1222·2022
800
ANNI



UNIVERSITÀ
DEGLI STUDI
DI PADOVA

Giovedì 20 febbraio 2020
Ore 15:00 - Aula "A. Rostagni"

Prof. Riccardo Zecchina

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The out-of-equilibrium physics of deep learning

Deep neural networks (DNN) are becoming fundamental learning devices for extracting information from data in a variety of real-world applications and in natural and social sciences. The learning process in DNN consists of finding a minimizer of a highly non-convex loss function that measures how well the data are classified. This optimization task is typically solved by tuning millions of parameters by stochastic gradient algorithms.

The learning process is often observed to be able to find good minimizers without getting stuck in local critical points, and that such minimizers are often satisfactory at avoiding overfitting. How these two features can be kept under control in nonlinear devices com-

posed of millions of tunable connections is a profound and far reaching open question.

Here we discuss how to use the out-of-equilibrium techniques of statistical physics to study the peculiar geometrical structure of neural networks and to design novel learning algorithms.



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