



Politecnico
di Torino

Dipartimento di Scienze
Matematiche "G. L. Lagrange"



Wednesday [June 8](#) at 16:30

Hosted on: [Zoom](#)

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An initial alignment between neural network and target is needed for gradient descent to learn

Prof. Chiadò-Piat introduces the seminar.

Abstract

In this work, we introduce the notion of “Initial Alignment” (INAL) between a neural network at initialization and a target function. It is proved that if a network and target function do not have a noticeable INAL, then noisy gradient descent on a fully connected network with normalized i.i.d. initialization will not learn in polynomial time. Thus a certain amount of knowledge about the target (measured by the INAL) is needed in the architecture design. This also provides an answer to an open problem posed in [Abbe and Sandon, 2020]. The results are based on deriving lower-bounds for descent algorithms on symmetric neural networks without explicit knowledge of the target function beyond its INAL.

Joint work with E. Abbé, J. Hazla, C. Marquis.

Biography

Elisabetta Cornacchia received her BSc in Mathematics for Engineering from the Polytechnic University of Turin and her MSc in Applied Mathematics from EPFL. Starting Fall 2019, she is pursuing a PhD in Mathematics at EPFL, under the supervision of Prof. Emmanuel Abbé.

She is recipient of the COLT 2021 Best Student Paper Award.