



UNIVERSITÀ  
DEGLI STUDI  
DI BERGAMO

Dipartimento  
di Ingegneria Gestionale,  
dell'Informazione e della Produzione

# Optimization and Learning Methods with Risk-Averse Objectives

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**Abstract:** We shall discuss optimization and learning problems where the objective is to optimize a risk measure of a random performance (loss) function. Problems of this type involve adversarial learning, distributionally robust learning, and risk-averse reinforcement learning. A major difficulty in such settings is the problem of obtaining statistical estimates of subgradients of such a composition. We shall present specialized algorithms for selected measures of risk and study their convergence for a broad class of nonsmooth and non-convex loss functions. Next, we shall introduce a new class of risk measures, called mini-batch risk forms, where the reference probability measure is an empirical measure and post-composition with expectation is employed. We shall derive their dual representation, study their pre-compositions with nonsmooth and nonconvex functions, and derive unbiased stochastic subgradients of such compositions.

Thursday, May 30, 2024 - 11:00-12:00  
Room C3.02, School of Engineering, Dalmine (BG)

Link MTeams:

[https://teams.microsoft.com/l/meetup-join/19%3ameeting\\_NTM4M2YwYzItYmJhMi00Y2U5LWE4M2QtYzE3NjFiNDU3OWQx%40thread.v2/0?context=%7b%22Tid%22%3a%224f0132f7-dd79-424c-9089-b22764c40ebd%22%2c%22Oid%22%3a%2210bf8574-9e46-413a-81ad-c598bdd6ab7d%22%7d](https://teams.microsoft.com/l/meetup-join/19%3ameeting_NTM4M2YwYzItYmJhMi00Y2U5LWE4M2QtYzE3NjFiNDU3OWQx%40thread.v2/0?context=%7b%22Tid%22%3a%224f0132f7-dd79-424c-9089-b22764c40ebd%22%2c%22Oid%22%3a%2210bf8574-9e46-413a-81ad-c598bdd6ab7d%22%7d)

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