Vienna School of Mathematics

PhD Colloquium

Rossen Nenov

Optimization, One Obstacle at a Time

Abstract: How hard can it be to minimize a function? Just follow the negative gradient, and surely everything will work out. Right?

In this talk, we will take a journey through the world of optimization, starting with the simplest possible idea: gradient descent. Along the way, we will discover that going downhill does not necessarily mean getting anywhere, that a single nonsmooth point can cause unexpected trouble, and that even seemingly simple optimization problems can become surprisingly difficult.

Each obstacle will motivate a new idea, leading us from gradient descent to subgradients, proximal methods, acceleration, and eventually to convex duality and primal-dual algorithms. Finally, we will see how some of these ideas can even help us tackle nonconvex problems through difference-of-convex optimization.

Rather than focusing on technical proofs, we will use simple examples and visual intuition to explore not just how these methods work, but why we need them in the first place.

November 16, 2026, 15:00-16:30

SR 6, Faculty of Mathematics, Universität Wien
(Oskar-Morgenstern-Platz 1)