▸ PEDRO PINTO, *Proof mining and the convex feasibility problem.*
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In this talk, we will discuss a recent proof mining study [1] regarding the strong convergence of Dykstra's algorithm. Proof mining [2] employs proof-theoretical techniques to analyse *prima facie* noneffective mathematical proofs with the goal of extracting additional information. Such new information is usually in the form of effective and highly uniform rates or bounds. In the last twenty-five years, this area of Proof Theory has been greatly developed by Ulrich Kohlenbach and his collaborators, and proof mining techniques have been particularly successful in applications to nonlinear analysis and adjacent areas. In convex optimization, many practical problems can be framed in the setting of the convex feasibility problem [3], i.e. finding the projection onto the intersection of finitely many convex sets under the assumption that the projection onto the individual sets is easy to compute. We will discuss new results regarding the asymptotic behavior of the well-known Dykstra's algorithm [4, 5], obtained via proof mining techniques.

[1] Pedro Pinto, *On the finitary content of Dykstra's algorithm*, ***Manuscript in preparation***, (2023).

[2] Ulrich Kohlenbach, ***Applied proof theory: proof interpretations and their use in mathematics***, Springer Monographs in Mathematics, Springer, 2008.

[3] Heinz H. Bauschke and Jonathan M. Borwein, *On projection algorithms for solving convex feasibility problems*, ***SIAM Review***, vol. 38 (1996), no. 3, pp. 367–426.

[4] Richard L Dykstra, *An algorithm for restricted least squares regression*, ***Journal of the American Statistical Association***, vol. 78 (1983), no. 384, pp. 837–842.

[5] James P. Boyle and Richard L. Dykstra, *A Method for Finding Projections onto the Intersection of Convex Sets in Hilbert Spaces*, ***Advances in Order Restricted Statistical Inference. Lecture Notes in Statistics, vol. 37*** (Richard L. Dykstra, Tim Robertson and Farroll T. Wright, editors), Springer, New York, 1986, pp. 28–47.