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Dykstra's Algorithm as the Nonlinear Extension of Bregman's Optimization Method

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Abstract: We show that Dykstra's algorithm with Bregman projections, which finds the Bregman projection of a point onto the nonempty intersection of finitely many closed convex sets, is actually the nonlinear extension of Bregman's primal-dual, dual coordinate ascent, row-action minimization algorithm. Based on this observation we give an alternative convergence analysis and a new geometric interpretation of Dykstra's algorithm with Bregman projections which complements recent work of Censor and Reich, Bauschke and Lewis, and Tseng.

Keywords: Bregman projection, convex programming, Dykstra's algorithm

Classification (MSC2000): 47N10, 49M30, 90C25

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