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I-PROJECTION ONTO ISOTONIC CONES AND ITS APPLICATIONS TO MAXIMUM LIKELIHOOD ESTIMATION FOR LOG-LINEAR MODELS

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Abstract. A frequently occurring problem is to find a probability vector, $p \in D$, which minimizes the I-divergence between it and a given probability vector π. This is referred to as the I-projection of π onto D. Darroch and Ratcliff (1972, *Ann. Math. Statist.*, **43**, 1470–1480) gave an algorithm when D is defined by some linear equalities and in this paper, for simplicity of exposition, we propose an iterative procedure when D is defined by some linear inequalities. We also discuss the relationship between I-projection and the maximum likelihood estimation for multinomial distribution. All of the results can be applied to isotonic cone.

Key words and phrases: I-divergence, I-projection, isotonic cone, log-linear models.