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Legendre transforms, Laplace transforms and valuations

Beautiful characterizations of Legendre transforms via the concept of duality were established by Artstein-Avidan and Milman [Ann. of Math. 2009]. One of the key points in their arguments is that dualities are "strong" valuations, namely, the maximum and the "minimum" of convex functions are interchanged by dualities. In this talk, I will present some characterizations of Legendre transforms via the concept of valuation and affine "invariance". Laplace transforms can be also characterized by similar properties. Hence we may say that Legendre transforms and Laplace transforms are siblings.