Dpto. Estadística e Investigación Operativa

Subdifferential calculus of integral functions

Abstract: We begin by giving explicit characterizations for the exact and the approximate subdifferential mappings of convex integral functions defined on Separable Banach spaces (or, more generally, Suslin locally convex spaces). These characterizations involve the approximate subdifferential mappings of the data convex functions defining the associated normal integrand, and do not require any qualification continuity condition on the involved functions, nor special topological or algebraic structures of the index set. Those formulas given exclusively by means of the data functions use the approximate subdifferential (say the epsilon-subdifferential) but with varying amounts of epsilon depending on the associated functions. However, formulas, which use a fixed amount of epsilon, not depending on the function, require the additional term invoking the normal cone to the domain of the integral function. A part of its proper interest, the discrete case corresponding to the sum of countable infinitely many convex functions is studied in order to illustrate the general results and, from the other hand, to cast a bridge between our results and the classical problem dealing with the subdifferential of the sum of finitely many convex functions. We shall in a second stage apply this result to establish necessary optimality conditions for a problem of calculus of variations of Bolsa type. This work is in a collaboration with A. Jourani and R. Correa.

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Lugar: Seminario de Matemáticas y Estadística