1077-90-179 **Elena Constantin*** (constane@pitt.edu), University of Pittsburgh-Johnstown, Mathematics Department, 450 Schoolhouse Road, Johnstown, PA 15904. *First and Second Order Tangent Cones and Their Applications in Set Constrained Optimization.*

Our goal is to characterize Pavel and Ursescu's second-order tangent cones to the null-set $G^{-1}(0)$ of a Fréchet differentiable map G between two linear normed spaces at a point $x \in G^{-1}(0)$, in the degenerate case where the derivative of G at x is identically zero. We use Ursescu first-order tangent cone to formulate sufficient optimality conditions for a locally Lipschitz functional on a convex subset of a finite dimensional normed space. We employ the first and the second-order tangent cones to give necessary conditions of extremum for a locally Lipschitz functional on an arbitrary subset of a Banach space. We analyze some examples to illustrate the applicability of our results. (Received August 08, 2011)