

Yu. S. Ledyaev* and **Q. J. Zhu** (`{ledyaev,zhu}@wmich.edu`), Department of Mathematics, Western Michigan University, Kalamazoo, MI 49008, USA, *Multidirectional Mean Value Inequalities and Weak Monotonicity*

Multidirectional mean value inequalities provide estimates of the difference of the extremal value of a function on a given bounded set and its value at a given point in terms of its (sub)-gradient at some intermediate point. We demonstrate that such multidirectional mean value inequalities and their generalizations can be obtained by using sufficient conditions for the approximate weak monotone decrease of a function along approximate trajectories of differential inclusions which allows us to remove a traditional assumption of lower boundedness on the function. We also obtain criteria for the approximate weak monotonicity and r -growth of lower semicontinuous functions using some discontinuous feedback constructions.