1116-49-1892   **Robert J Kipka*** (`kipka@mast.queensu.ca`), Robert Kipka, Department of Math & Stats, Jeffery Hall, University Ave., Kingston, Ontario K7L 3N6, Canada, and **Yuri S. Ledyaev**. *A generalized multi-directional mean value inequality.*

Since the appearance of the first multi-directional mean value inequality in 1994, theorems of this type have proven their utility through nontrivial applications in the areas of optimization and control theory. Stated in terms of nonsmooth or variational analysis, such theorems nonetheless provide novel and important information even for smooth problems. Among the applications of the original theorem is a short proof of Subbotin's theorem, which provides an important connection between subgradients and Dini subderivates.

Certain recent problems in dynamic optimization have required a mean value inequality that incorporates variations originating in topological vector spaces. In this talk we show how such an extension can be obtained in a general setting, derive a corresponding Subbotin-type theorem, and point out applications of these general theorems to problems in the areas of optimal control and calculus of variations. (Received September 21, 2015)