VIETNAM ACADEMY OF SCIENCE AND TECHNOLOGY
INSTITUTE OF MATHEMATICS

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BRIEF SUMMARY OF PhD THESIS

Title: **Some Problems on Differentiation and Integration in Nonsmooth Analysis and Optimization Theory**

Specialization: Optimization Theory Code: 62 46 20 01

PhD student: Nguyen Huy Chieu

Scientific advisors: 1. Prof. Dr. Sc. Nguyen Dong Yen
2. Assoc. Prof. Dr. Nguyen Nang Tam

Training institutions: Institute of Mathematics,
Vietnam Academy of Science and Technology

New results presented in the thesis:

1. Representation formulae for the Aumann integral of the Clarke (and Mordukhovich) subdifferential mapping, and necessary and sufficient conditions for this integral to be a singleton.
2. An analogue of the classical Newton-Leibniz formula for the case of set-valued integral. New proof for a known theorem on the possibility of the Clarke subdifferential mapping in characterizing functions.
3. A formula for computing exactly the Mordukhovich subdifferential of indefinite integrals.
4. A formula for computing exactly the Mordukhovich subdifferential of integral functionals on $L_1(\Omega;E)$. This formula implies a new criterion for the existence of local minimizers of an unconstrained optimization problem with the objective function being an integral functional.
5. Some characterizations of reflexive Banach spaces and a sufficient condition for the density of the range of the Fréchet subdifferential mapping in X^*.
6. Two theorems on the existence of stationary points of the perturbed problem of an infinite-dimensional optimization problem under linear perturbations.
7. Two propositions on the solution existence of the perturbed problem of an infinite-dimensional convex programming problem under linear perturbations.

Hanoi, January 07, 2011

PhD student

Nguyen Huy Chieu