

INTENSIVE LECTURE SERIES in Mathematics, Keio

Speaker: Prof. Alexander Ioffe
(Department of Mathematics, The Technion)



Title: Variational Analysis and NonSmooth Regularity

Lecture 1

Date: 16:30 ~ 18:00 April 27, Thursday, 2006

Place: Seminar Room 203, 14th Building, Yagami Campus

Metric regularity theory. (Introduction to the subject. Ekeland's variational principle and error bounds. Definition and various characterizations of regular points of mappings between metric spaces.)

Lecture 2

Date: 16:30 ~ 18:00 April 28, Friday, 2006

Place: Seminar Room 203, 14th Building, Yagami Campus

Subdifferential calculus and regularity in Banach spaces. (Brief introduction to the theory of subdifferentials of non-differentiable functions on Banach spaces, subdifferential characterization of regular and critical behavior, non-smooth extensions of the Lusternik-Graves and implicit function theorems).

Lecture 3

Date: 16:30 ~ 18:00 May 11, Thursday, 2006

Place: Discussion Room 217, 14th Building, Yagami Campus

Sard theorem for stratified and definable mappings. (A brief account of the theory of definable set in o-minimal structures and a sketch of the proof of an extension of Sard's theorem to non-smooth definable mappings and, more generally, to set-valued mappings whose graphs admit stratifications of a slightly weaker type than Whitney stratification).

Suppose we have a family of problems depending on a certain parameter. What will happen with solutions when parameter changes? How it is possible to know whether the behavior of solutions is sufficiently regular in one or another sense or to guarantee such behavior? The classical analysis has developed a variety of tools to deal with such problems: implicit function theorem, Lusternik-Graves theorem, Sard's theorem, Thom's transversality theorem. Modern variational analysis is concerned with extensions of such results and basic ideas behind them to "bad" maps and functions. The main stimulus to these studies comes from optimization theory and calculus of variations.