國立陽明交通大學應用數學系
學術演講公告

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講　題：Stability and instability estimates for inverse problems

時　間：113 年 9 月 24 日(星期二) 下午 14:00 –15:00

地　點：(光復校區) 科學一館 213 室

Abstract

According to Hadamard's definition, a well-posed problem satisfies three criteria: existence, uniqueness, and continuous dependence on the data. Most of forward problems (e.g., the boundary value problem or Calder´on's problem) can be proved to be well-posed. However, many inverse problems are known to be ill-posed, for example, the inverse boundary value problem in which one would like to determine unknown parameters from the boundary measurements. The failure of the continuous dependence on the data in Hadamard's sense makes the feasible determination of unknown parameters rather difficult in practice. However, if one restricts the unknown parameters in a suitable subspace, one can restore the continuous dependence or stability. Nonetheless, the ill-posedness nature of the inverse problem may give rise a logarithmic type modulus of continuity. For Calder´on's problem, such logarithmic stability estimate was derived by Alessandrini and Mandache showed that this estimate is optimal by proving an instability estimate of exponential type. When we consider the time-harmonic equation, it was first proved by Isakov that the stability increases as the frequency increases. In this talk, I would like to discuss a refinement of Mandache's idea aiming to derive explicitly the dependence of the instability estimate on the frequency. If time allows, I also want to discuss the increasing stability phenomenon from the statistical viewpoint based on the Bayes approach. The aim is to show that the posterior distribution contracts around the true parameter at a rate closely related to the decreasing instability estimate derived above.

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