

**The Hong Kong Polytechnic University  
Department of Applied Mathematics**

**Colloquium**

**Uniqueness of a parameter inverse problem for time-fractional diffusion equations by  
inexact data**

**By**

**Prof. Yikan Liu  
Hokkaido University**

**Abstract**

Recently, linear theories for time-fractional diffusion equations have been well established and related inverse problems have been studied intensively. Among many similarities with usual parabolic equations, they show essential difference in the slow decay depending on the order of time derivatives, which has been applied to determining orders and parameters. In literature, uniqueness for such inverse problems was proved with coinciding data, but there seems no stability result with noisy data. Only using initial inexact data at a single point, in this research we obtained uniqueness for determining orders and parameters simultaneously with unknown initial values, which is stronger than stability. Further, in some special case we can even conclude the uniqueness of initial values. The proof relies on the asymptotic expansion after taking the Laplace transform and the completeness of generalized eigenfunctions. This is a joint work with Prof. Masahiro Yamamoto (The University of Tokyo).



[Click to join \(Zoom\)](#)

**Date: 24 March 2022 (Thursday)**

**Time: 15:00-16:00 (Hong Kong Standard Time GMT +8)**

**Venue: Online Talk via Zoom (Meeting ID: 951 9892 5718)**

**Speaker: Prof. Yikan Liu, Hokkaido University**

**Host: Dr. Zhi Zhou, The Hong Kong Polytechnic University**

**Click to join:**

**<https://polyu.zoom.us/j/95198925718?pwd=NTNSU09oUVEF2RkswWXY5MzlDVUyZz09>**

**\*\*\* ALL ARE WELCOME \*\*\***

For enrolment, please send your name and email to [wai-yan.moon@polyu.edu.hk](mailto:wai-yan.moon@polyu.edu.hk) on or before 23 March 2022