



深圳北理莫斯科大学

УНИВЕРСИТЕТ МГУ-ППИ В ШЭНЬЧЖЭНЕ

SHENZHEN MSU-BIT UNIVERSITY

应用数学讲座

Научный Семинар по Прикладной Математике

Research Seminar on Applied Mathematics

应用数学报告 (15)

报告人 / Докладчик / Speaker:

Prof. Michael Victor Klibanov, University of North Carolina at Charlotte

题目 / Название / Title:

A New Tendency in Numerical Methods for Coefficient Inverse Problems

时间 / Время / Time: **28 April 2021, 10:00-11:00am**

地点 / Место / Venue: **Zoom online meeting**

ID: 627 9292 0219

Password: 210428

摘要 / Аннотация / Abstract:

Since the field of Inverse Problems is an applied one, it is insufficient just to prove some theorems. Rather it is necessary to develop reliable numerical methods. However, conventional numerical methods for Coefficient Inverse Problems (CIPs) are unreliable. The reason is that they are based on the minimization of least squares cost functionals. These functionals are non convex. Therefore, as a rule, they have many local minima and ravines. Since any minimization procedure can stop at any local minimum, which can be far from the true solution, then these methods are unreliable and unstable.

In the past several years Klibanov and his research team have successfully developed a radically new and very effective method of solving CIPs. Furthermore, this method is verified on a variety of microwave experimental data. This is the so-called "convexification" method. In the convexification one constructs a globally strictly convex weighted Tikhonov-like functional. Therefore, the problem of local minima is avoided. The key to this functional is the presence in it of the so-called Carleman Weight Function. This is the function which is involved as the weight in the Carleman estimate for the corresponding Partial Differential Operator.

The convexification will be presented for a broad variety of CIPs. Numerical results will also be presented for both computationally simulated and experimental data.

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