



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 (41)

报告人 / Докладчик / Speaker: V.G. Romanov 院士 (俄罗斯科学院(新西伯利亚), Sobolev 数学所)

题目 / Название / Title: Inverse kinematic and integral geometry problems and their applications

时间 / Время / Time: 5 Jul. 2022, 10:00-12:00AM

地点 / Место / Venue: Zoom ID: 927 4245 7061;
Password: 220705

摘要 / Аннотация / Abstract:

In my talk I give posing an inverse kinematic problem as problem of recovering the conformal Riemannian metric in a compact domain Ω from Riemannian distances between arbitrary points of the boundary of Ω . With physical point of view this problem consists in recovery a speed in Ω from given travel time $\tau(x, y)$ between arbitrary points x and y belonging to $\partial\Omega$. A stability estimate of solutions of this problem is given. Then I introduce an integral geometry problem that consists in recovering a function from its integral along a family of geodesic line of the conformal Riemannian metric. A stability estimate of solutions of this problem is also given. As an application of the considered problems, an acoustic tomography problem is discussed. In this problem 3 unknown coefficients need to be found, namely, a speed of the sound $c(x)$, an attenuation $\sigma(x)$ and a density $\rho(x)$. It is demonstrated that, under some convenient information about solutions of a forward problem, the recovering $c(x)$ is reduced to the inverse kinematic problem and recovering $\sigma(x)$ and $\rho(x)$ is reduced to some integral geometry problems.

V.G. Romanov 院士简介:

V.G. Romanov 院士, 俄罗斯科学院(新西伯利亚), Sobolev 数学所。Romanov 是国际知名偏微分方程反问题的专家, 发表高水平文章超过 300 篇。其于 1987 年 12 月评为俄罗斯科学院通讯院士, 2022 年 6 月评为院士。