

TENSOR TOMOGRAPHY AND THE INVERSE KINEMATIC PROBLEM

I will survey the recent results obtained with Gunther Uhlmann on the inverse kinematic problem (known also as boundary/lens rigidity) and its linearization: integrals of 2-tensor fields over geodesics. On a compact manifold (M, g) with boundary, the inverse kinematic problem asks whether one can determine the metric g , up to an isometry, by measuring the travel times and the outgoing points and directions of the geodesics issued from all (or some) points and directions on the boundary. This problem is a mathematical model for travel time seismography, where one tries to determine the structure of the Earth by travel times of seismic waves. Although this problem is formulated in geometric terms, our approach is mostly based on microlocal and other analysis techniques.