

1030-53-228

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Travel Time and Tensor Tomography.

Let M be a compact manifold with boundary. We study the following problem: can we recover a Riemannian metric on M , up to an isometry, from the travel times of waves through M ? The interest on this problem is motivated by applications in seismology: recover the inner structure of the Earth from travel times of seismic waves. We study manifolds without conjugate points as well as some cases of conjugate points. We analyze in detail the linearization that turns out to be a tomography problem for tensor fields. We will review the recent progress on this problem obtained jointly with G. Uhlmann that include uniqueness results, stability, and incomplete data results. (Received August 03, 2007)