

The boundary rigidity problem

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These lectures are part of the "Geometric Structures" course. I will introduce the boundary rigidity problem which consists in determining the Riemannian metric of a compact Riemannian manifold with boundary from lengths of geodesics joining points in the boundary. This problem arises in geophysics and can be recast as determining the anisotropic index of refraction of a medium from the first travel times joining points at the boundary of the medium. I will assume basic concepts of Riemannian geometry like geodesics, covariant derivative etc.