1011-58-139 **Vladimir A. Sharafutdinov*** (sharaf@math.nsc.ru), Institute of Mathematics, 4 Koptyug Avenue, 630090 Novosibirsk, Russia. *Linearized boundary distance rigidity problem and Dirichlet-to-Neumann map.*

For a compact Riemannian manifold (M, g) with boundary, the Dirichlet-to-Neumann map $\Lambda_g : C^\infty(\partial M) \to C^\infty(\partial M)$ is defined by $\Lambda_g h = \partial u/\partial\nu|_{\partial M}$, where u is the solution to the Dirichlet problem $\Delta_g u = 0$, $u|_{\partial M} = h$. We calculate the derivative $\dot\Lambda_f = d\Lambda_{g_t}/dt|_{t=0}$ with respect to a variation $g_t = g + tf$ of the metric g, where f is a rank 2 symmetric tensor field. We try to describe all tensor fields f satisfying $\dot\Lambda_f = 0$. Some partial results are obtained in the multidimensional case. In the 2D-case, the complete answer is obtained: $\dot\Lambda_f = 0$ iff f is the sum of potential and spherical tensor fields. Then we apply latter results to investigating the linearized boundary distance rigidity problem. Our main result is as follows. In the case of a simple compact two-dimensional manifold, the kernel of the ray transform coincides with the space of potential tensor fields. This result was known before under stronger assumptions on the metric. (Received August 23, 2005)