An inverse boundary value problem for harmonic differential forms

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Comments and Errata for "MS Joshi and WRB Lionheart, An inverse boundary value problem for harmonic differential forms"[1]

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1 Comments

This paper [1] for various reasons took a long time to appear in print in *Asymptotic Analysis*. The work was done essentially in 1999, and was slightly improved from comments recieved from presenting the work at the EMS Summer School and Conference held in Edinburgh, Scotland 2000. We revised the preprint on Arxiv but were still slightly unsatisfied by the use of an "unnatural" Dirichlet-to-Neumann map. When we finally had a chance to revise the paper in the light of referees' comments we took the opportunity to correct this and posted a final preprint on ArXiv in 2003 including Corr 2.1. This reinterprets the main result in terms of a natural Dirichlet-to-Neumann map defined in invariant terms.

During 2005 the second author recieved the preprint of Belishev and Sharafutdinov [2]. This elegant paper concentrates on the recovery of topological information from the Dirichlet-to-Neumann map on differential forms, in contrast to our paper in which the C^∞ jet of the metric is determined. However at the time of writing Belishev and Sharafutdinov only knew of the 2000 preprint of [1] even though it had already appeared in Asymptotic Analysis in 2003. Hence the referencein that paper to our unnatural operator. In fact the Dirichlet-to-Neumann map in [2] is exactly our $\Pi_{g\,\tau\tau}$.

The second author had the privilage of presenting this work in a seminar at the Steklov Institute in St Petersburg while visiting Mikhail Belishev in November 2006. At that time it became clear that to some extent the "upper left block" $\Pi_{g\,\tau\tau}$ of our Dirichlet-to-Neumann is in some way the more fundamental in that (1) only diagonal terms are necessary for recovery of the Taylor series of the metric (2) $\Pi_{g\,\nu\nu}$ is obtained by from $\Pi_{g\,\tau\tau}$ by conjugation with the Hodge star.

2 Errata

In equation (1.2) the final '+' should be '−'. This does not affect the argument: the point is there are boundary terms. For a derivation see p6 of [2]. Reference [5] of the paper is infact a two dimensional result: the correct reference is Lassas, Taylor and Uhlmann [3].

3 Addresses

Mark Joshi is currently at the Deptartment of Economics University of Melbourne. Bill Lionheart has not moved, but after merger of two universities in Manchester he is now at the School of Mathematics, The University of Manchester.

References

[1] MS Joshi and WRB Lionheart, An inverse boundary value problem for harmonic differential forms, Asymptotic Analysis 41(2), 2005, p93-106. Reviews: MathSciNet 2006a:35313 Zentralblatt 1068.35185. Preprint ArXiv: math.AP/9911212

[2] M Belishev and V Sharafutdinov, Dirichlet to Neumann Operator on Differential Forms, preprint 2006.

[3] Lassas M Taylor M, Uhlmann G, The Dirichlet-to-Neumann map for Complete Riemannian Manifolds with Boundary Communications in Analysis and Geometry, 19(2003), 207-221. Preprint on line