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PRESCRIBING THE STRAIN OF A DIFFEOMORPHISM AND SOLVABILITY OF THE SINGULAR CAUCHY PROBLEM

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CONTENTS

1. Introduction

1.1. Summary. In this article we study diffeomorphisms between Riemannian manifolds in the case when two of the eigenvalues coincide to order zero on a smooth submanifold of codimension one. To prove the existence of such a diffeomorphism, one must consider a singular nonlinear differential system: the rank of the symbol of the system drops on a smooth submanifold Σ, and every covector based on Σ is characteristic for the system. The techniques from differential systems theory do not apply, because they all rest upon the hypothesis of locally constant rank of the symbol. In this article we prove a local solvability theorem for singular differential systems in the real-analytic category and apply it to the eigenvalue problem. In a forthcoming article we use the same local solvability theorem to solve the Ricci problem for symmetric tensor fields whose rank has a jump on a hypersurface.

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