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彈性系統相關的正問題及反問題(1/3)

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Report on "Some direct and inverse problems for the elasticity system (1/3) (93-2115-M-002-012-)"

Jenn-Nan Wang

This is a report on the NSC grant 93-2115-M-002-012 entitled "Some direct and inverse problems for the elasticity system (1/3)". The main theme of this grant is to investigate some direct and inverse problems for elasticity systems. My aim is to understand some fundamental properties of elasticity systems with anisotropic medium. This is a special kind of elliptic systems. I am grateful to the grant support from NSC. Now I list several results benefited from this grant.

1. With Ching-Lung Lin and Gen Nakamura, we derived three sphere inequalities for a two-dimensional elliptic system which includes the elasticity system in the plane. Here we consider the anisotropic medium. Three sphere inequalities have only been proved for scalar operators or isotropic elasticity systems so far. We deal with anisotropic systems in our work. This work is currently under review for journal publication.

2. With Victor Isakov and Masahiro Yamamoto, we investigate the inverse problem of recovering the residual stress by a single pair of cauchy data on the boundary. In this work, we study a hyperbolic type equation with small residual stress. A novelty of our result is that we are able to derive a Lipschitz type stability estimate for this inverse problem. Our method is based on Carleman estimates derived in my previous work. This paper is currently under proofreading.

Besides of the results above, several topics are under investigation including applications of oscillating-decaying solutions to inverse problems, other inverse problems for the simple residual system, and some fundamental properties of the general residual system etc.