

Meeting: 999, Nashville, Tennessee, SS 9A, Special Session on Inverse Problems

999-35-104 **Lester Caudill*** (lcaudill@richmond.edu), Department of Mathematics and Computer Scienc,
University of Richmond, 205 Jepson Hall, Richmond, VA 23173, and **Kurt Bryan.** *Boundary
Determination from Overposed Boundary Data in Parabolic Problems.* Preliminary report.

We discuss inverse problems of boundary determination for parabolic initial-boundary value problems. In this setting, the desired unknown is a portion of the boundary of the spatial domain. This unknown is to be determined from a single Cauchy data pair prescribed on another portion of the boundary. This type of inverse problem models the use of thermal methods in nondestructive damage assessment. This specific problem could represent a model of thermal imaging, in which an inaccessible portion of the boundary of a sample is to be estimated by temperature measurements (resulting from an induced heat flux pattern) taken on another portion of the boundary.

We discuss uniqueness for this inverse problem, and important stability issues. We present a numerical algorithm designed to produce stable and reliable approximate solutions to this problem. We also discuss a number of important and interesting issues, both of a theoretical and practical nature, that arise in the study of this inverse problem. (Received August 16, 2004)