

A source reconstruction algorithm for the Stokes system from incomplete velocity measurements

By: [Garcia, GC](#) (Garcia, Galina C.)^[1]; [Montoya, C](#) (Montoya, Cristhian)^[2]; [Osses, A](#) (Osses, Axel)^[3]

[View ResearcherID and ORCID](#)

INVERSE PROBLEMS

Volume: 33

Issue: 10

Article Number: 105003

DOI: 10.1088/1361-6420/aa863f

Published: OCT 2017

Document Type: Article

[View Journal Impact](#)

Abstract

We consider the inverse problem of determining the spatial dependence of a source of the form $f(x)\sigma(t)$ in the Stokes system defined in $\Omega \times (0, T)$, assuming that $\sigma(t)$ is known and $f(x)$ is divergence-free. The only available observation is a single internal measurement of the velocity and the acceleration, for which one of its components is missing. Under adequate hypothesis on σ we prove uniqueness of this inverse problem and we establish an explicit reconstruction formula. This formula provides the spectral coefficients $f(k)$ of the source f in terms of a family of null controls $h(\tau)$ for the corresponding adjoint system indexed by τ is an element of $(0, T]$.

Keywords

Author Keywords: [inverse source problem](#); [null controllability](#); [stokes system](#)

KeyWords Plus: [INVERSE SOURCE PROBLEM](#); [NULL-CONTROLLABILITY](#)

Author Information

Reprint Address: Garcia, GC (reprint author)

Univ Santiago Chile, Dept Matemat & Ciencia Computac, Casilla 307, Correo 2,
Santiago, Chile.

Addresses:

[1] Univ Santiago Chile, Dept Matemat & Ciencia Computac, Casilla 307,Correo 2, Santiago, Chile

+ [2] Univ Chile, Dept Ingn Matemat, Casilla 170-3,Correo 3, Santiago, Chile

+ [3] Univ Chile, CNRS, UMI 2807, Ctr Modelamiento Matemat, Santiago, Chile

E-mail Addresses: galina.garcia@usach.cl; cmontoya@dim.uchile.cl; axosses@dim.uchile.cl

Funding

Funding Agency	Grant Number
DICYT	041633GM
CONICYT	2014-21140888
Fondecyt Conicyt	1151512
CONICYT Anillo ACPA	ACT1106
MathAmsud	15MATH-02-SOCDE

[View funding text](#)

Publisher

IOP PUBLISHING LTD, TEMPLE CIRCUS, TEMPLE WAY, BRISTOL BS1 6BE, ENGLAND

Journal Information

- **Impact Factor:** [Journal Citation Reports](#)

Categories / Classification

Research Areas:Mathematics; Physics

Web of Science Categories:Mathematics, Applied; Physics, Mathematical