

## Accepted Manuscript

Logarithmic stability in determining the time-dependent zero order coefficient in a parabolic equation from a partial Dirichlet-to-Neumann map. Application to the determination of a nonlinear term

Mourad Choulli, Yavar Kian

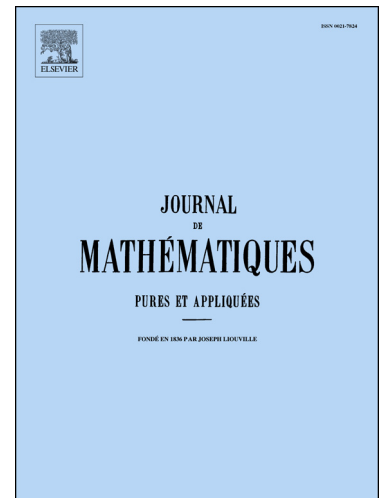
PII: S0021-7824(17)30198-8  
DOI: <https://doi.org/10.1016/j.matpur.2017.12.003>  
Reference: MATPUR 2970

To appear in: *Journal de Mathématiques Pures et Appliquées*

Received date: 22 December 2016

Please cite this article in press as: M. Choulli, Y. Kian, Logarithmic stability in determining the time-dependent zero order coefficient in a parabolic equation from a partial Dirichlet-to-Neumann map. Application to the determination of a nonlinear term, *J. Math. Pures Appl.* (2017), <https://doi.org/10.1016/j.matpur.2017.12.003>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Logarithmic stability in determining the  
time-dependent zero order coefficient in a parabolic  
equation from a partial Dirichlet-to-Neumann map.  
Application to the determination of a nonlinear term

Mourad Choulli<sup>a,\*</sup>, Yavar Kian<sup>b</sup>

<sup>a</sup>*IECL, UMR CNRS 7502, Université de Lorraine, Boulevard des Aiguillettes BP 70239  
54506 Vandoeuvre Les Nancy cedex- Ile du Saulcy - 57 045 Metz Cedex 01 France*

<sup>b</sup>*Aix Marseille Université, CNRS, CPT UMR 7332, 13288 Marseille, France & Université  
de Toulon, CNRS, CPT UMR 7332, 83957 La Garde, France*

---

**Abstract**

We give a new stability estimate for the problem of determining the time-dependent zero order coefficient in a parabolic equation from a partial parabolic Dirichlet-to-Neumann map. The novelty of our result is that, contrary to the previous works, we do not need any measurement on the final time. We also show how this result can be used to establish a stability estimate for the problem of determining the nonlinear term in a semilinear parabolic equation from the corresponding “linearized” Dirichlet-to-Neumann map. This is the first result for this kind of inverse problems. The key ingredient in our analysis is a parabolic version of an elliptic Carleman inequality due to Bukhgeim and Uhlmann [11]. This parabolic Carleman inequality enters in an essential way in the construction of *complex geometric optic* (abbreviated to CGO in this text) solutions that vanish at a part of the lateral boundary and initial or final time.

**Résumé.**

Nous démontrons un nouveau résultat de stabilité concernant la détermination du terme d'ordre zéro, dans une équation parabolique, à partir de l'opérateur Dirichlet-à-Neumann. La nouveauté est que, contrairement aux résultats précédents, nous pouvons nous affranchir de la connaissance de la donnée en temps final. Nous appliquons ensuite ce résultat pour établir la stabilité pour le problème inverse qui consiste à déterminer le terme non linéaire, dans une équation parabolique semi-linéaire, à partir de l'opérateur Dirichlet-à-Neumann “linéarisé” correspondant. Notre analyse est fondée sur la construction de solutions de l'optique géométrique nulles sur une partie du bord ainsi qu'en temps initial ou final. La construction de ces solutions particulières repose,

---

\*Corresponding author

*Email addresses:* mourad.choulli@univ-lorraine.fr (Mourad Choulli),  
yavar.kian@univ-amu.fr (Yavar Kian)

Download English Version:

<https://daneshyari.com/en/article/8902398>

Download Persian Version:

<https://daneshyari.com/article/8902398>

[Daneshyari.com](https://daneshyari.com)