

Accepted Manuscript

Approximate correctors and convergence rates in almost-periodic homogenization

Zhongwei Shen, Jinping Zhuge

PII: S0021-7824(17)30139-3

DOI: <https://doi.org/10.1016/j.matpur.2017.09.014>

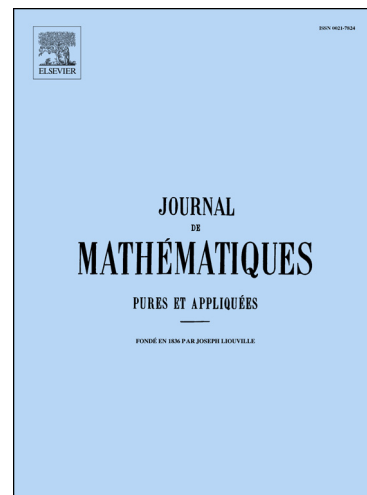
Reference: MATPUR 2940

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

Received date: 23 May 2016

Please cite this article in press as: Z. Shen, J. Zhuge, Approximate correctors and convergence rates in almost-periodic homogenization, *J. Math. Pures Appl.* (2017), <https://doi.org/10.1016/j.matpur.2017.09.014>

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.



Approximate Correctors and Convergence Rates in Almost-Periodic Homogenization

Zhongwei Shen^{a,1,*}, Jinping Zhuge^{a,1}

^a*Department of Mathematics
University of Kentucky
Lexington, Kentucky 40506
USA*

Abstract

We carry out a comprehensive study of quantitative homogenization of second-order elliptic systems with bounded measurable coefficients that are almost-periodic in the sense of H. Weyl. We obtain uniform local L^2 estimates for approximate correctors in terms of a function that quantifies the almost-periodicity of the coefficient matrix. We give a condition that implies the existence of (true) correctors. These estimates as well as similar estimates for the dual approximate correctors yield optimal or near optimal convergence rates in H^1 and L^2 . The L^2 -based Hölder and Lipschitz estimates at large scale are also established.

Keywords:

Homogenization, Almost Periodic, Approximate Correctors, Convergence Rates.

2010 MSC: 35B27, 74Q20.

1. Introduction

In this paper we shall be interested in quantitative homogenization of a family of second-order elliptic operators with rapidly oscillating almost-periodic coefficients,

$$\mathcal{L}_\varepsilon = -\operatorname{div}(A(x/\varepsilon)\nabla) = -\frac{\partial}{\partial x_i} \left\{ a_{ij}^{\alpha\beta} \left(\frac{x}{\varepsilon} \right) \frac{\partial}{\partial x_j} \right\}, \quad \varepsilon > 0 \quad (1.1)$$

(the summation convention is used throughout). We assume that the coefficient matrix $A(y) = (a_{ij}^{\alpha\beta}(y))$ with $1 \leq i, j \leq d$ and $1 \leq \alpha, \beta \leq m$ is real, bounded measurable, and satisfies the ellipticity condition,

$$\mu|\xi|^2 \leq a_{ij}^{\alpha\beta}(y)\xi_i^\alpha\xi_j^\beta \leq \mu^{-1}|\xi|^2 \quad \text{for a.e. } y \in \mathbb{R}^d \text{ and } \xi = (\xi_i^\alpha) \in \mathbb{R}^{m \times d}, \quad (1.2)$$

*Corresponding author

Email addresses: zshen2@uky.edu (Zhongwei Shen), jinping.zhuge@uky.edu (Jinping Zhuge)

¹Supported in part by NSF grant DMS-1161154.

Download English Version:

<https://daneshyari.com/en/article/8902440>

Download Persian Version:

<https://daneshyari.com/article/8902440>

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