

ADDITIONAL ORDER CONVERGENCE IN QUALOCATION FOR ELLIPTIC BOUNDARY INTEGRAL EQUATIONS

R.D. GRIGORIEFF

Communicated by Kendall Atkinson

Dedicated to I.H. Sloan

ABSTRACT. In this paper additional order of convergence is studied in the qualocation method for elliptic periodic pseudodifferential operators. Splines with multiple knots are used as trial and test spaces. Results are proved for both constant and variable coefficients.

1. Introduction. In this paper we study the qualocation method for pseudodifferential operators of the form

$$(1.1) \quad L = L_0 + L_1,$$

where

$$(1.2) \quad L_0 v(x) := \sum_{n=-\infty}^{\infty} \sigma_0(x, n) \hat{v}(n) e^{i2\pi n x} \quad \text{for } x \in \mathbf{T}.$$

Here $\mathbf{T} := \mathbf{R} \setminus \mathbf{Z}$ is the one-dimensional torus of length 1 and

$$\hat{v}(n) = \int_{\mathbf{T}} v(x) e^{-i2\pi n x} dx \quad \text{for } n \in \mathbf{Z}$$

are the complex Fourier coefficients of a 1-periodic distribution $v : \mathbf{T} \rightarrow \mathbf{R}$ so that

$$v(x) = \sum_{n=-\infty}^{\infty} \hat{v}(n) e^{i2\pi n x} \quad \text{for } x \in \mathbf{T}.$$

Received by the editors on August 3, 2009.

DOI:10.1216/JIE-2011-23-3-383 Copyright ©2011 Rocky Mountain Mathematics Consortium