

# Multigrid Methods for a Biharmonic Problem with Boundary Conditions of the Cahn-Hilliard Type

## **Abstract**

We present multigrid methods for a biharmonic problem with boundary conditions of the Cahn-Hilliard type. These multigrid methods are based on discretizations obtained by a quadratic  $C^0$  interior penalty method. Since the finite element space is a standard space for second order problems, multigrid solves for second order problems can be used naturally in the smoothing steps. We will present theoretical results and numerical results, including GPU implementation of the multigrid algorithms.