1030-35-286 **Marta Lewicka*** (lewicka@math.umn.edu), School of Mathematics, University of Minnesota, Minneapolis, MN 55455. *The uniform Korn-Poincare inequality in thin domains.*

The Korn inequality is a basic tool for the existence of solutions of linearized displacement-traction equations in elasticity. It also arises naturally in the study of incompressible flow under the Navier boundary conditions. Other applications include plate theories or modeling a gravitational field.

Motivated by applications to dynamics of Navier-Stokes equations in thin 3-dimensional domains, we study the Korn-Poincaré inequality:

$$\|u\|_{W^{1,2}(S^h)} \leq C_h \|D(u)\|_{L^2(S^h)},$$

under the tangentiality condition at the boundary:

$$u \cdot \vec{n}^h = 0 \qquad \text{on } \partial S^h,$$

in domains S^h that are shells of small thickness of order h, around an arbitrary smooth and closed hypersurface S in $\mathbf{R}^n$. By $D(u)$ we denote the symmetric part of the gradient ∇u.

We show that, in general, the constant C_h may blow up as $h \to 0$, even if S is not rotationally symmetric. We then prove that C_h remain uniformly bounded for vector fields u inside any family of cones in $W^{1,2}(S^h)$ (with angle $< \pi/2$, uniform in h), around the orthogonal complement of the extensions of Killing fields on S.

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