Stanislav Hencl

Measures of non-compactness of classical embeddings of Sobolev spaces

Preprint No. MATH-KMA-2001/67

November 2001

Submitted to *Mathematische Nachrichten*

Department of Mathematical Analysis, Faculty of Mathematics and Physics,
Charles University, Sokolovská 83, 186 75 Praha 8, Czech Republic

http://www.karlin.mff.cuni.cz/kma-preprints/

Cover print by Reprostředisko, Malostranské nám. 25, Praha 1 - Malá Strana
Design by Mirko Rokyta, picture of snowflake by Ondřej Kalenda
Current series administrator: Mirko Rokyta

List of preprints released in this series

All preprints available on http://www.karlin.mff.cuni.cz/kma-preprints/
E-mail contact to series administrator: kma-prep@karlin.mff.cuni.cz

1999

[KMA-1999-01] Miroslav Zelený, Jan Pelant: *The structure of the σ-ideal of σ-porous sets.* (June 1999)

[KMA-1999-02] Ondřej Kalenda: *Valdivia compacta and equivalent norms.* (June 1999)

[KMA-1999-03] Ondřej Kalenda: *Embedding the ordinal segment $[0, \omega_1]$ into continuous images of Valdivia compacta.* (June 1999)

[KMA-1999-04] Jan Kolář, Jaroslav Lukeš: *Simultaneous solutions of the weak Dirichlet problem.* (June 1999)

[KMA-1999-05] Bohuslav Balcar, Miroslav Hušek: *Sequential continuity and submeasurable cardinals.* (June 1999)

[KMA-1999-06] Mirko Rokyta: *On the solvability of a nonlinear discrete problem corresponding to a higher-order finite volume approximation in 2D.* (June 1999)

[KMA-1999-07] Jan Čerych: *Pervasive algebras on planar compacts.* (June 1999)

[KMA-1999-08] Petr Holický, Miroslav Zelený: *Arsenin - Kunugui theorem and weak forms of Borel bimeasurability.* (June 1999)

[KMA-1999-09] Petr Holický: *Generalized analytic spaces, completeness and fragmentability.* (June 1999)

[KMA-1999-10] David E. Edmunds, Ron Kerman, Luboš Pick: *Optimal Sobolev imbeddings involving rearrangement-invariant quasinorms.* (August 1999)

[KMA-1999-11] A. Cianchi, R. Kerman, B. Opic, L. Pick: *A sharp rearrangement inequality for fractional maximal operator.* (September 1999)

[KMA-1999-12] Ondřej Kalenda: *Valdivia compacta and subspaces of $C(K)$ spaces.* (October 1999)

[KMA-1999-13] David Preiss, Luděk Zajíček: *On Dini and approximate Dini derivates of typical continuous functions.* (October 1999)

[KMA-1999-14] Ondřej Kalenda: *Valdivia compacta and biduals of Asplund spaces.* (November 1999)

[KMA-1999-15] Janusz J. Charatonik, Pavel Pyrih: *On piecewise confluent mappings.* (December 1999)

[KMA-1999-16] Janusz J. Charatonik, Pavel Pyrih: *Atomic mappings can spoil lightness of open mappings.* (December 1999)

[KMA-1999-17] Miroslav Zelený: *Remark on Debs – Saint-Raymond theorem.* (December 1999)

2000

[KMA-2000-18] Ralph Chill, Eva Fašangová: *Equality of two spectra arising in harmonic analysis and semigroup theory.* (January 2000)

[KMA-2000-19] Jan Malý: *Sufficient conditions for change of variables in integral.* (February 2000)

[KMA-2000-20] Pavel Pyrih: *An example for mappings related to semi-confluence.* (February 2000)

[KMA-2000-21] Pavel Pyrih, David Opěla, Robert Šámal: *An example of openly minimal dendrite.* (February 2000)

[KMA-2000-22] Jiří Spurný: *On the Dirichlet problem for functions of the first Baire class.* (February 2000)

[KMA-2000-23] Pavel Pyrih: *An example of self-homeomorphic dendrite not strongly self-homeomorphic.* (February 2000)

[KMA-2000-24] Pavel Pyrih, Tomáš Bárta, David Opěla, Pavel Růžička, Robert Šámal: *Irreducible mapping and the lightness of open mappings.* (February 2000)

[KMA-2000-25] Amiran Gogatishvili, Luboš Pick: *Duality principles and reduction theorems.* (March 2000)

[KMA-2000-26] David Opěla, Pavel Pyrih, Robert Šámal: *Chain of dendrites openly unbounded from bellow.* (March 2000)

[KMA-2000-27] Petr Holický, Václav Komínek: *Two remarks on the structure of the set of exposed and extreme points.* (March 2000)

[KMA-2000-28] David Preiss, Luděk Zajíček: *Directional derivatives of Lipschitz functions.* (March 2000)

[KMA-2000-29] Ondřej Kalenda: *A characterization of weakly Lindelöf determined Banach spaces.* (March 2000)

[KMA-2000-30] Jakub Duda: *On inverses of δ-convex mappings.* (April 2000)

In May 2000 this preprint series has been incorporated into a broader one of the entire School of Mathematics, Faculty of Mathematics and Physics, Charles University, and therefore the preprint numbering has been changed.

[MATH-KMA-2000/31] P. Gurka, F. J. Martín-Reyes, P. Ortega, L. Pick, M. D. Sarrión, A. de la Torre: *Good and bad measures.* (May 2000)

[MATH-KMA-2000/32] Robert Černý, Jan Malý: *Counterexample to lower semicontinuity in Calculus of Variations.* (May 2000)

[MATH-KMA-2000/33] Jan Malý, Luboš Pick: *An elementary proof of sharp Sobolev embeddings.* (May 2000)

[MATH-KMA-2000/34] Petr Holický, Luděk Zajíček: *Nondifferentiable functions, Haar null sets and Wiener measure.* (May 2000)

[MATH-KMA-2000/35] Jaroslav Milota: *Continuous semigroups and evolution equations.* (October 2000)

[MATH-KMA-2000/36] Jan Malý, Luboš Pick: *The sharp Riesz potential estimates in metric spaces.* (November 2000)

[MATH-KMA-2000/37] Mirko Rokyta: *A suitable replacement of the BV condition for finite volume schemes on unstructured grids.* (November 2000)

[MATH-KMA-2000/38] Jan Rychtář: *Uniformly Gâteaux differentiable norms in spaces with unconditional basis.* (November 2000)

[MATH-KMA-2000/39] Ondřej Kalenda: *Note on Markushevich bases in subspaces and quotients on Banach spaces.* (November 2000)

[MATH-KMA-2000/40] M. Carro, L. Pick, J. Soria, V.D. Stepanov: *On embeddings between classical Lorentz spaces.* (November 2000)

[MATH-KMA-2000/41] Eva Fašangová: *A Banach algebra approach to the weak spectral mapping theorem for $\mathcal{C}_0$-groups.* (December 2000)

2001

[MATH-KMA-2001/42] Jakub Duda, Libor Veselý, Luděk Zajíček: *On D.C. functions and mappings.* (January 2001)

[MATH-KMA-2001/43] W. D. Evans, Bohumír Opic, Luboš Pick: *Real interpolation with logarithmic functors.* (January 2001)

[MATH-KMA-2001/44] Robert Černý, Jan Malý: *Yet more counterexample to lower semicontinuity in Calculus of Variations.* (February 2001)

[MATH-KMA-2001/45] Wolfgang Desch, Eva Fašanga, Jaroslav Milota, Wilhelm Schappacher: *Stress boundary value problem in linear viscoleasticity.* (February 2001)

[MATH-KMA-2001/46] Ondřej Kalenda: *A new Banach space with Valdivia dual unit ball.* (February 2001)

[MATH-KMA-2001/47] Petr Holický, Roman Kotecký, Miloš Zahradník: *Phase diagram of horizontally invariant Gibbs states for lattice models.* (February 2001)

[MATH-KMA-2001/48] Stanislav Hencl: *On the notions of absolute continuity for functions of several variables.* (February 2001)

[MATH-KMA-2001/49] Jaroslav Lukeš, Jan Malý, Ivan Netuka, Michal Smrčka, Jiří Spurný: *On approximation of affine Baire-one functions.* (March 2001)

[MATH-KMA-2001/50] Wolfgang Desch, Eva Fašanga, Jaroslav Milota, Wilhelm Schappacher: *Riccati operators in non-reflexive spaces.* (March 2001)

[MATH-KMA-2001/51] Petr Holický, Václav Komínek: *On projections of nonseparable Souslin and Borel sets along separable spaces.* (April 2001)

[MATH-KMA-2001/52] Jan Lang: *Improved estimates for the approximation numbers of Hardy-type operators.* (May 2001)

[MATH-KMA-2001/53] Luboš Pick, Michael Růžička: *An example of a space $L^{p(x)}$ on which the Hardy–Littlewood maximal operator is not bounded.* (May 2001)

[MATH-KMA-2001/54] Amiran Gogatishvili, Bohumír Opic, Luboš Pick: *Weighted inequalities for Hardy-type operators involving suprema.* (May 2001)

[MATH-KMA-2001/55] Ondřej Kalenda: *M-bases in spaces of continuous functions on ordinals.* (June 2001)

[MATH-KMA-2001/56] Stanislav Hencl, Jan Malý: *Mappings of finite distortion: Hausdorff measure of zero sets.* (June 2001)

[MATH-KMA-2001/57] András Bátkai, Eva Fašanga: *The spectral mapping theorem for Davies' functional calculus.* (June 2001)

[MATH-KMA-2001/58] Jan Rychtář: *Renormings of $C(K)$ spaces.* (August 2001)

[MATH-KMA-2001/59] Ondřej Kalenda: *A weak Asplund space whose dual is not Stegall.* (August 2001)

[MATH-KMA-2001/60] Jiří Jelínek: *On introduction of two diffeomorphism invariant Colombeau algebras.* (August 2001)

[MATH-KMA-2001/61] Jiří Jelínek: *Equality of two diffeomorphism invariant Colombeau algebras.* (August 2001)

[MATH-KMA-2001/62] Ondřej Kalenda, Kenneth Kunen: *On subclasses of weak Asplund spaces.* (October 2001)

[MATH-KMA-2001/63] Andrea Cianchi, Luboš Pick: *Sobolev embeddings into spaces of Campanato, Morrey and Hölder type.* (October 2001)

[MATH-KMA-2001/64] Eva Fašanga: *Spectral mapping theorems and spectral space–independence.* (October 2001)

[MATH-KMA-2001/65] Miroslav Zelený: *An example of $\mathcal{C}^{1,1}$ function, which is not a d.c. function.* (October 2001)

[MATH-KMA-2001/66] Eva Matoušková, Miroslav Zelený: *A note on intersections of non-Haar null sets.* (November 2001)

[MATH-KMA-2001/67] Stanislav Hencl: *Measures of non-compactness of classical embeddings of Sobolev spaces.* (November 2001)