Josef Daněček, Oldřich John, Jana Stará

# Structural conditions guaranteeing $C^{1,\gamma}$ - regularity of weak solutions to nonlinear second order systems

Preprint No. MATH-KMA-2005/176

October 2005

Submitted to *Nonlinear Analysis, TMA*

---

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 – 2003

For the details on the 122 papers submitted in years 1999 – 2003 see the web page of the preprint series.

## 2004

[MATH-KMA-2004/123] Petr Holický: *Extension of Borel measurable maps and ranges of Borel bimesurable maps.*

[MATH-KMA-2004/124] Jiří Spurný: *Affine Baire–one functions on Choquet simplexes.*

[MATH-KMA-2004/125] Luděk Zajíček: *On $\sigma-$porous sets in abstract spaces (a partial survey).*

[MATH-KMA-2004/126] R. Chill, E. Fašangová, G. Metafune, D. Pallara: *The sector of analycity of the Ornstein-Uhlenbeck semigroup on $L^p$ spaces with respect to invariant measure.*

[MATH-KMA-2004/127] Petr Hájek, Michal Johanis: *Isomorphic Embeddings and Harmonic Behaviour of Smooth Operators.*

[MATH-KMA-2004/128] Tomáš Bárta: *On a Viscoelastic Problem.*

[MATH-KMA-2004/129] Étienne Matheron, Miroslav Zelený: *Rudin-like sets and hereditary families of compact sets.*

[MATH-KMA-2004/130] Dalibor Pražák: *Reducing the 2d Navier-Stokes equations to a system of delayed ODEs.*

[MATH-KMA-2004/131] Luděk Zajíček, Miroslav Zelený: *Inscribing closed non-$\sigma$-lower porous sets into Suslin non-$\sigma$-lower porous sets.*

[MATH-KMA-2004/132] Petr Dostál, Jaroslav Lukeš, Jiří Spurný: *Measure convex and measure extremal sets.*

[MATH-KMA-2004/133] Ondřej Kalenda, Jiří Spurný: *Extending Baire-one functions on topological spaces.*

[MATH-KMA-2004/134] Petr Holický, Luděk Zajíček, Miroslav Zelený: *A remark on a theorem of Solecki.*

[MATH-KMA-2004/135] Jakub Duda: *On a decomposition of superreflexive spaces.*

[MATH-KMA-2004/136] Jakub Duda: *Curves with finite turn.*

[MATH-KMA-2004/137] Jan Kališ: *On Whitney sets and their generalization.*

[MATH-KMA-2004/138] David Pavlica: *A d.c. $C^1$ function need not be the difference of convex $C^1$ functions.*

[MATH-KMA-2004/139] Bernd Kawohl, Jana Stará: *Observations on a nonlinear evolution equation.*

[MATH-KMA-2004/140] Salvatore Leonardi, Jiří Kottas, Jana Stará: *Hölder regularity of the solutions of some class of elliptic systems in convex non-smooth domains.*

[MATH-KMA-2004/141] Miroslav Zelený: *Descriptive properties of $\sigma$-porous sets.*

[MATH-KMA-2004/142] María J. Carro, Amiran Gogatishvili, Joaquim Martín, Luboš Pick: *Functional properties of rearrangement invariant spaces defined in terms of oscillations.*

[MATH-KMA-2004/143] Ondřej Kalenda: *Remark on the abstract Dirichlet problem for Baire-one functions.*

[MATH-KMA-2004/144] Luděk Zajíček: *On differentiability properties of typical continuous functions and Haar null sets.*

[MATH-KMA-2004/145] Jakub Duda, Luděk Zajíček: *Banach-Zarecki theorem for functions with values in metric spaces.*

[MATH-KMA-2004/146] Petr Holický: *Borel sets with countable sections for nonseparable spaces.*

[MATH-KMA-2004/147] Jiří Spurný: *On lattice structure of the space of pointwise limits of harmonic functions.*

[MATH-KMA-2004/148] Jiří Spurný: *The weak Dirichlet problem for Baire functions.*

[MATH-KMA-2004/149] M. Bulíček, J. Málek, D. Pražák: *On the dimension of the attractor for a class of fluids with pressure dependent viscosities.*

[MATH-KMA-2004/150] Jiří Jelínek: *Colombeau product of currents.*

[MATH-KMA-2004/151] Miroslav Hušek: *Productivity numbers in topological spaces.*

[MATH-KMA-2004/152] Josef Daněček, Oldřich John, Jana Stará: *Interior $C^{1,\gamma}$-regularity for weak solutions of non-linear second order parabolic systems.*

[MATH-KMA-2004/153] Libor Veselý, Luděk Zajíček: *On connection between d.c. mappings and convex operators.*

## 2005

[MATH-KMA-2005/154] Petr Holický a Václav Komínek: *Descriptive properties of mappings between nonseparable Luzin spaces.*

[MATH-KMA-2005/155] Jiří Spurný: *Affine Baire-one functions on compact convex sets.*

[MATH-KMA-2005/156] Jakub Duda: *On metric and $w^*$-differentiability of pointwise Lipschitz mappings.*

[MATH-KMA-2005/157] Jakub Duda, Luděk Zajíček: *Curves in Banach spaces – differentiability via homeomorphisms.*

[MATH-KMA-2005/158] David Pavlica, Luděk Zajíček: *Morse-Sard theorem for d.c. functions and mappings on $R^2$.*

[MATH-KMA-2005/159] David Pavlica, Luděk Zajíček: *On the directions of segments and r-dimensional balls on a convex surface.*

[MATH-KMA-2005/160] Jan Malý, Miroslav Zelený: *A note on Buczolich's solution of the Weil gradient problem: a construction based on an infinite game.*

[MATH-KMA-2005/161] Ron Kerman, Luboš Pick: *Optimal Sobolev Imbedding Spaces.*

[MATH-KMA-2005/162] Jakub Duda: *On positively differentiable curves with values in Banach spaces.*

[MATH-KMA-2005/163] Jaroslav Fuka, Petr Holický: *On a weak form of uniform convergence.*

[MATH-KMA-2005/164] Eva Murtinová: *On products of discretely generated spaces.*

[MATH-KMA-2005/165] Ron Kerman, Luboš Pick: *Compactness of Sobolev imbeddings involving rearrangement-invariant norms.*

[MATH-KMA-2005/166] Dalibor Pražák: *A remark on characterization of entropy solutions using Colombeau's algebra of generalized functions.*

[MATH-KMA-2005/167] Ondřej Kalenda, Jiří Spurný: *A solution of the abstract Dirichlet problem for Baire-one functions.*

[MATH-KMA-2005/168] Dalibor Pražák: *The 2d Navier-Stokes equations in the form of ODEs with bounded delay.*

[MATH-KMA-2005/169] Ondřej Kalenda: *Descriptive hierarchy of complex Banach spaces.*

[MATH-KMA-2005/170] Robert Černý: *Local monotonicity of measures supported by curves in $R^n$.*

[MATH-KMA-2005/171] É. Matheron, S. Solecki, M. Zelený: *Trichotomies for ideals of compact sets.*

[MATH-KMA-2005/172] Nguyen Duc Huy, Jana Stará: *On existence and regularity of solutions to a class of generalized stationary Stokes problem.*

[MATH-KMA-2005/173] Petr Kaplický, Dalibor Pražák: *Differentiability of the solution operator and the dimension of the attractor for certain power-law fluids.*

[MATH-KMA-2005/174] Jan Pelant, Petr Holický, Ondřej Kalenda: *$C(K)$ spaces which cannot be uniformly embedded into $c_0(\Gamma)$.*

[MATH-KMA-2005/175] Jan Rychtář, Jiří Spurný: *On weak$^*$ Kadec-Klee norms.*

[MATH-KMA-2005/176] Josef Daněček, Oldřich John, Jana Stará: *Structural conditions guaranteeing $C^{1,\gamma}$ - regularity of weak solutions to nonlinear second order systems.*