

Hassan IBRAHIM

30/4/1981, Lebanese.

Personal Address :

Al-Shiah

Beirut-Lebanon

Tel : +961 70 127544

Professional Address :

Lebanese University

Faculty of Sciences-I,

Hadath-Beirut,

e-mail : ibrahim@cermics.enpc.fr

webpage : <http://cermics.enpc.fr/~ibrahim/home.html>

Research Themes

- Singular parabolic systems of PDEs describing dislocation dynamics.
- Viscosity solutions for non-linear Hamilton-Jacobi equations.
- Entropy solutions for scalar conservation laws.
- Harmonic analysis and logarithmic Sobolev inequalities.
- Error estimates in homogenization of ODEs.
- Numerical methods : fast marching method for transport equations.

Formation

- From 2009 : Associate Professor at the Lebanese University.
- From 2009 : Instructor of Mathematics at the Lebanese International University.
- 2008 - 2009 : Temporary Research and Teaching Associate (ATER) at University Paris Dauphine (Paris 9).
- 2005 - 2008 : PhD thesis in applied mathematics from "Ecole Nationale des Ponts et Chaussées - ENPC"
(Graduated with highest honors and the congratulations of the jury).

Thesis title : *Analysis of parabolic/Hamilton-Jacobi systems modelizing the dynamics of dislocation densities in a bounded domain.*

Jury : G. Barles (examinator), J. Droniou (PhD reporter), M. Effendiev (examinator), M. Jazar (PhD co-advisor), R. Monneau (PhD advisor), N. Nassif (examinator), B. Perthame (PhD reporter), J.-L. Vázquez (president).

- 2004 - 2005 : Master 2 « PDEs & Non-linear analysis », Lebanese University, major of promotion.
- 2001 - 2003 : Master 1 « Mathematics », Lebanese University.
- 2000 - 2001 : Second year Maths-Info, Faculty of Sciences, Lebanese University.
- 1998 - 2000 : Preparatory class, Faculty of Engineering, Lebanese University.
- 1997 - 1998 : Lebanese Baccalaureate, option : elementary Mathematics.

Participation in projects

1. Member of the ANR MICA, *Mouvements d'Interfaces, Calcul et Applications.*
2. Member of the ACI JC 1025, *dynamics of dislocations.*
3. Member of the project Gallilé no 14639PG-2007, *Franco-Italian cooperation.*
4. Member of the CEA (center of atomic energy)-ENPC project no 4600151919.
5. Member of the water project, international project (Lebanon : LaMA Liban, Tripoli).

Accepted papers :

1. Existence and uniqueness for a nonlinear parabolic/Hamilton-Jacobi coupled system describing the dynamics of dislocation densities. *Ann. I. H. Poincaré Anal. Non Linéaire* 26 (2009) 415-435.
2. (with M. Jazar and R. Monneau) Global existence of solutions to a singular parabolic/Hamilton-Jacobi coupled system with Dirichlet conditions, *C. R. Acad. Sci. Paris, Ser. I* 346 (2008) 945-950.
3. (with R. Monneau) On a parabolic logarithmic Sobolev inequality, *J. Funct. Anal.* 257 (2009) 903-930.
4. (with M. Jazar and R. Monneau) Dynamics of dislocation densities in a bounded channel. Part II : existence of weak solutions to a singular Hamilton-Jacobi/parabolic strongly coupled system, *Communications in Partial Differential Equations*, 34 (2009), no. 8, 889-917.
5. (with A. El Hajj and R. Monneau) Dislocation dynamics : from microscopic models to macroscopic crystal plasticity, *Continuum Mech. Thermodyn.* 21 (2009), no. 2, 109-123.
6. (with A. El Hajj and R. Monneau) Derivation and study of dynamical models of dislocation densities, *ESAIM : PROCEEDINGS*, May 2009, Vol. 27, p. 227-239.
7. (with A. El Hajj and R. Monneau) Homogenization of dislocation dynamics, *IOP Conf. Series : Materials Science and Engineering* 3 (2009) 012023.
8. (with M. Jazar and R. Monneau) Dynamics of dislocation densities in a bounded channel. Part I : smooth solutions to a singular coupled parabolic system, *Commun. Pure Appl. Anal.*, 9 (2009), no 3, 703-719.
9. (with R. Monneau) On the rate of convergence in homogenization of scalar first order ordinary differential equations, *SIAM J. Math. Anal.*, Vol. 42 (2010), No. 5, pp. 2155-2176.
10. A generalization of a logarithmic Sobolev inequality to the Hölder class, *accepted for publication in Journal of Function Spaces and Applications*.

Submitted papers :

1. (with A. Fino and R. Monneau) The Peierls-Nabarro model as a limit of a Frenkel-Kontorova model, *submitted*.
2. (with A. Fino) Decay of mass for fractional evolution equation with memory term, *submitted*.
3. Critical parabolic Sobolev embeddings via Littlewood-Paley decomposition, *submitted*.

Papers in preparation :

1. (with A. Fino) Analytical solution for the space-time fractional telegraph equation, *in preparation*.
2. (with R. Monneau) Formal relativistic asymptotics of Peierls-Nabarro type models, *in preparation*.

PhD students

- Mohamad Al Haj, Mathematical analysis of elasto-visco-plastic models describing dislocation dynamics, with co-advisors Régis Monneau (ENPC-France) and Raafat Talhouk (Lebanese University). Started on October 2010.

Computer skills

- Languages : C, C++, Matlab, Scilab.
- Software : Latex, Prosper, Excel, Powerpoint...

Languages

- Arabic : maternal language.
- English : excellent.
- French : very good.