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Education

2006/02/15

Degree at the University of Firenze:

Title of thesis: "Stime per equazioni differenziali di tipo Ornstein-Uhlenbeck."

Advisor: Professor Vincenzo Vespri (University of Firenze).

2009/12/21

PhD in Mathematics and Application at the University of Milano-Bicocca.

Title of PhD thesis: "Conservation laws in gas dynamics and traffic flow."

Advisor: Professor Rinaldo M. Colombo (University of Brescia).

Research Interests

My research interests concern hyperbolic PDEs and conservation laws.

I got results concerning the well posedness of models for the dynamics of fluids in pipe networks (in collaboration with Rinaldo M.Colombo, Graziano Guerra and Veronika Schleper) and for the water flow in open channels (in collaboration with Graziano Guerra and M. Herty).

Concerning the traffic flow, I developed a new macroscopic traffic model displaying two phases, establishing a connection between this model and other (macroscopic, kinetic and microscopic) descriptions found in the literature (in collaboration with Rinaldo M.Colombo and Michel Rascle).

Publications

G. Guerra, F. Marcellini, V. Schleper. Balance Laws with Integrable Unbounded Sources. *SIAM Journal of Mathematical Analysis*, 41: 1164–1189, 2009.

R.M. Colombo, F. Marcellini. Smooth and discontinuous Junctions in the p -system. *Journal of Mathematical Analysis and Applications*, 361: 440-456, 2010.

R.M. Colombo, F. Marcellini. Coupling Conditions for the 3×3 Euler System. *Networks and Heterogeneous Media*, 5: 675–690, 2010.

R.M. Colombo, F. Marcellini, M. Rascle. A 2–Phase Traffic Model Based on a Speed Bound. *SIAM Journal on Applied Mathematics*, 70: 2652–2666, 2010.

G. Guerra, M. Herty, F. Marcellini. Modeling and Analysis of Pooled Stepped Chutes. To appear on *Networks and Heterogeneous Media*, 2011.

R.M. Colombo, F. Marcellini. Smooth and Discontinuous Junctions in the p -system and in the 3×3 Euler System. *Riv. Mat. Univ. Parma*, 3: 000-000, 2012, to appear.

Talks

I communicated some of the results studied at the following meetings:

Communication: "Entropy and stability of classical solutions"
during the SMI course "Partial Differential Equations"
Cortona 15-28.07.2007.

Communication: "Junctions in gas pipelines"
during the meeting "Conservation Laws and Applications"
Brescia 28.05.2008.

Communication: "Smooth and discontinuous junctions in the p-system"
during the meeting: "Sixth meeting on Hyperbolic Conservation Laws and Fluid Dynamics: Recent results and Research perspectives"
L'Aquila 17-19.07.2008.

Communication: "Smooth and discontinuous junctions in the p-system and in the 3×3 Euler system"
during the meeting: "Intensive Research Month on Hyperbolic Conservation Laws and Fluid Dynamics"
Parma 22-28.02.2010.

Communication: "A 2-Phase Traffic Model Based on a Speed Bound."
during the meeting: "Eighth meeting on Hyperbolic Conservation Laws and Fluid Dynamics: Recent results and Research perspectives"
S.I.S.S.A-I.S.A.S., Trieste 02-04.09.2010.

Visits and collaborations

From 08 to 15 February (2009) I visited the University of Nice, France,
for a collaboration with Professor Michel Rascle

"Nonlinear Conservation Laws and Applications"
Minneapolis, USA, 13-31.07.2009
Summer Program, Institute for Mathematics and Its Applications, University of Minnesota

From 18 to 25 July (2010) I visited the University of Aachen, Germany,
for a collaboration with Professor Michel Herty

From 29 August to 04 September (2011) I visited the University of Aachen, Germany,
for a collaboration with Professor Michel Herty

Conferences, schools and courses

I attained the following courses, schools and conferences:

"Nonlinear Hyperbolic problems"
Roma 28.05-01.06.2007

"Partial Differential Equations"
Cortona 15-28.07.2007
(SMI)

Courses by Prof. Constantine Dafermos (Brown University) and Prof. Piero D'Ancona ("La Sapienza" University)

"Evolution Equations in Pure and Applied Sciences"
Firenze 18-19.04.2008

"Conservation Laws and Applications"

Brescia 28.05.2008

”Nonlinear Partial Differential Equations and Applications”

Cetraro, 22-28.06.2008

(CIME)

Courses by Prof. Stefano Bianchini (SISSA/ISAS), Prof. Eric A. Carlen (School Math. Georgia Inst. Technology), Prof. Alexander Mielke (WIAS Berlin), Prof. Felix Otto (Inst. Appl. Math., Univ. Bonn), Prof. Cedric Villani (ENS Lyon).

“Sixth meeting on Hyperbolic Conservation Laws and Fluid Dynamics: Recent results and Research perspectives”

L’Aquila 17-19.07.2008

“Optimal Transportation, Geometry and Functional Inequalities”

Pisa, 28.10-31.10.2008

“First Winter School at IMEDEA on PDEs and Inequalities”

Madrid, 25.01-30.01.2009

“Modelling and Optimisation of Flows on Networks”

Cetraro, 15-19.06.2009

(CIME)

Courses by Prof. Luigi Ambrosio (SNS, Pisa), Prof. Alberto Bressan (Penn State University), Prof. Dirk Helbing (ETH), Prof. Axel Klar (Kaiserlautern University), Prof. Christian Ringhofer (Arizona University), Prof. Enrique Zuazua (Basque Center for Applied Mathematics).

“Seventh meeting on Hyperbolic Conservation and Fluid Dynamics: Recent results and Research perspectives”

S.I.S.S.A.–I.S.A.S., Trieste 31.08-04.09.2009

“Intensive Research Month on Hyperbolic Conservation Laws and Fluid Dynamics“

Parma 22-28.02.2010.

“Eighth meeting on Hyperbolic Conservation and Fluid Dynamics: Recent results and Research perspectives”

S.I.S.S.A.–I.S.A.S., Trieste 02-04.09.2010.

Milano, 06/11/2011