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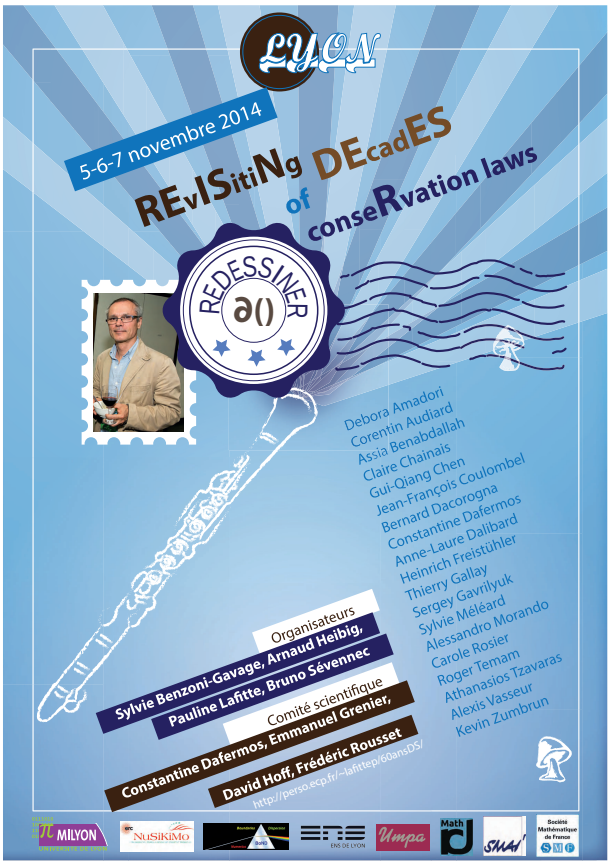
Denis Serre certainly likes the idea of being a mathematical great grandfather. In the early days of November 2014, most of his descendants were (re)united to celebrate his sixtieth birthday, in the city of Lyon where he spent most of his academic career, together with a number of mathematicians who became his friends over the years. He also loves wordplays and has plenty of hobbies that can be guessed from the poster of the meeting reproduced below.



Séverine Voisin

Even though he has always been very much interested in algebra — perhaps influenced by his uncle, whom he admires — Denis Serre has pioneered a number of ideas and techniques in the mathematical theory of fluid mechanics, and is one of the few world class experts who contributed to the development of the theory of hyperbolic conservation laws[1]. He was soon recognized as such, despite his writing

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[1]For a comprehensive overview of the state of the art, the reader may refer to the latest edition of Constantine Dafermos' monograph *Hyperbolic conservation laws in continuum physics*, which is a valuable complement to Denis Serre's own monograph *Systems of conservation laws*, unfortunately not re-edited since the year 2000.

only in French at the beginning. Along the way, he trained and has been a mentor for at least a dozen of us.

His early work dealt with the global existence of weak solutions to one-dimensional systems of conservation laws. In particular, he started by shedding new light on the freshly brewed compensated compactness method of Murat and Tartar. With his nice concept of eastern/western entropies, he managed to prove nontrivial properties of Young measures, thus generalizing earlier results by Di Perna.

He also got interested in what he called *rich systems*, which are by definition endowed with a complete set of Riemann invariants, and among which we find the Temple systems. This is, as far as I am concerned, the topic through which I entered the field. An achievement of Denis Serre regarding Temple systems is a convergence proof for the Glimm scheme, whatever the total variation of the initial data, which undoubtedly paved the way for the work of Alberto Bressan and his school about so-called *straight line systems*, which include (genuinely nonlinear) Temple systems.

In the 1990s, Denis Serre turned his attention to multidimensional Initial Boundary Value problems (IBVP), which were at that time not well understood despite seminal contributions by Kreiss, Majda, Osher, and Sakamoto. Even one-dimensional IBVPs still needed some clarification. With his then-student Marguerite Gisclon, he studied viscous boundary layers and inferred appropriate boundary conditions for the limiting hyperbolic problem. This path was later continued by Frédéric Rousset, also a student of him who has pursued a brilliant career since then. Initial Boundary Value problems are closely related to the stability of shock waves, be they viscous or sharp shocks. In a widely acknowledged work with Kevin Zumbrun, Denis Serre proved a remarkable connection between the low frequency, spectral stability of viscous shocks in several space dimensions, expressed in terms of an *Evans function*, and the spectral stability of sharp shocks, expressed in terms of the *Lopatinskii determinant*. I am also indebted to him for drawing my attention to this topic, and for embarking me on the hard but exciting writing of our joint monograph *Multidimensional hyperbolic partial differential equations*.

In the last decade or so, Denis Serre has made another series of original breakthroughs that are at the source of many pieces of work by others. To quote only one that has been very influential on my own work, he considered periodic traveling wave solutions to viscous systems of conservation laws, and proved that the hyperbolicity of the averaged equations 'à la Whitham' - also called modulated equations - is necessary for their spectral stability. This kind of result was anticipated by Whitham himself, but it is only recently that it was shown to hold true rigorously. After first results by Myunghyun Oh and Kevin Zumbrun in this direction, Serre pointed out indeed a strong relationship between the linearized modulated equations and the Evans function associated with periodic waves. Together with an earlier, hardly noticed work by Denis Serre and Sergey Gavrilyuk, this induced a leap in the understanding of Whitham equations.

Denis Serre is also known for the edition with Susan Friedlander of a monumental Handbook of Mathematical Fluid Dynamics. Published in four volumes, it has become a major reference regarding many aspects of mathematical fluid mechanics.

On top of everything else, he is proud of and recognized for his textbook *Matrices*, which has been accompanying generations of graduate students since its first publication in 2002. Besides this book, his latest contributions to Matrix theory not only make him an official algebraist but even led him to write the words 'probability' and 'random' in publications of him, which is quite a surprise.

The themes that were covered by the REDESSINER speakers reflect his eclectic taste.

- Debora Amadori, Università degli Studi dell'Aquila, L'Aquila, Italy
  L^1 error estimates for balance laws with space-dependent source
- Corentin Audiard, Université Pierre et Marie Curie, Paris
  Global well posedness without vacuum of the Euler-Korteweg equations for small data
- Assia Benabdallah, Aix-Marseille Université, Marseille
  Controllability of systems of differential equations
- Claire Chainais, Université Lille 1, Lille
  Numerical approximation of drift-diffusion equations
- Jean-François Coulombel, CNRS & Université de Nantes, Nantes
  Resolvent vs semigroup estimates for discretized hyperbolic initial boundary value problems
- Bernard Dacorogna, École Polytechnique Fédérale de Lausanne, Switzerland
  A Dirichlet problem involving the divergence operator
- Constantine Dafermos, Brown University, Providence, United States
  Hyperbolic Systems of Balance Laws with Dissipation
- Anne-Laure Dalibard, Université Pierre et Marie Curie
  Mathematical study of a degenerate boundary layer
- Heinrich Freistühler, Universität Konstanz, Constance, Germany
  Causal Dissipation and Shock Profiles in the Relativistic Fluid Dynamics of Pure Radiation
- Thierry Gallay, Université Joseph Fourier, Grenoble
  Orbital Stability of Periodic Waves in the Nonlinear Schrödinger Equation
- Sergey Gavrilyuk, Aix-Marseille Université, Marseille
  Hyperbolicity in hyperelasticity and applications to high-velocity impact problems
- Sylvie Méléard, École Polytechnique, Palaiseau
  From evolutionary ecology to nonlinear fractional reaction-diffusion equations
- Alessandro Morando, Università degli Studi di Brescia, Italy
  The linearized problem for MHD contact discontinuties
- Carole Rosier, Université du littoral, Calais
  Sharp-diffuse interfaces model for a seawater intrusion problem in free and confined aquifers
- Alexis Vasseur, Texas University, Austin, United States
  Study of shocks by relative entropy methods
- Roger Temam, Indiana University, Bloomington, United States
  Mathematical modelling of the humid atmosphere
- Athanasios Tzavaras, KAUST, Arabie Saoudite
  Hadamard instability, localization and formation of shear bands
- Kevin Zumbrun, Indiana University, Bloomington, United States
  Modulation of spatially periodic patterns and behavior of thin film flows

A few of these speakers have accepted to contribute either a survey or an original paper to this special volume dedicated to Denis Serre. They are warmly thanked for giving all the organizers of the REDESSINER meeting the opportunity to keep a record of this great and friendly scientific event.

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