UNIVERSITÀ DEGLI STUDI DELL'AQUILA
M&MOCS
International Research Center on
MATHEMATICS AND MECHANICS
OF COMPLEX SYSTEMS

LAUDATIO HECTOR J. SUSSMANN

Hector José Sussmann was born in Buenos Aires, Argentina, on April 13th, 1946. After obtaining the Licenciatura en Matematicas in his hometown, he attended the Courant Institute in Mathematical Sciences, New York, where he graduated in September 1969. He developed his research and teaching activity mainly at Rutgers University, New Bronswick, NJ, where he is currently Professor. Furthermore, he spent various semesters in several prestigious institutions, like University of Chicago, Harvard University, City College NY, and was invited for long or short periods in several scientific centers worldwide. He is currently Professor at Rutgers University, where he has been working since 1972.

The territory of H.J.Sussmann's scientific interests is vast and ranges from chief geometric and analytical aspects of nonlinear --possibly optimal-- control theory to stochastic differential equations, statistical mechanics, catastrophe theory, methodology of mathematical modeling, and neural nets, just to quote the main directions of his research. Tracks of H.J.Sussmann's passage through the lands of these mathematical fields are crucial and clearly detectable, characterized by a formidable robustness and generality of the results and, at the same time, by a tireless effort to discuss foundational issues. This is particularly true for control theory, in its analytical and geometric issues. As several mathematical constructions, developments in control theory have been strongly motivated by applications, at first in mechanics and then in other scientific, technological, and social disciplines. However, starting from the Seventies, a deeper mathematical insight has been felt as essential, both for establishing connections with classical areas --like Calculus of Variations, Differential Geometry, Dynamical Systems-- and for obtaining new interesting results needed in applications. It is

precisely in this delicate and spectacular process of *mathematization* of control theory that the figure of H.J.Sussmann plays a role of leader and master. Using his own well-grounded knowledge in many fields of Mathematics as well as his powerful aesthetic intuition, he attains striking generalizations of existing results and brings a great deal of new ideas and paradigms in control theory. The notions of "applied mathematician" and "pure mathematician" show their obsolescence and insufficiency when it comes to describe the skills of H.J.Sussmann. People working in the field of control theory, knows that every idea by him is a must read. His papers speak the language of an extraordinary conjugation between , rigor and deepness on the one hand, and elegance and beauty on the other hand. Among many other examples, let us quote the so-called Orbits' Theorem, whose thesis sounds as the realization of an impossible dream, while the proof is the fruit of an art-like, sophisticated ingenuity. The reformulation and astonishing generalization of the Maximum Principle is a further issue to which the name of Hector Sussmann is indelibly attached. And, as mentioned above, the whole operation is pursued together with the appraisal of the original Maximum Principle, especially in its essence of *set-separation* result. To synthetize the picture of this great mathematician, we could say that the *leitmotiv* of H.J. Susssmann's scientific adventure is well described in the opening lines of Levi-Civita's article "Come un conservatore…", where the Paduan mathematician explains how a loving attitude towards the classics is a sine qua non condition of every important advancement of human knowledge.