

ON THE 60th BIRTHDAY OF JORGE SOTOMAYOR

by Ronaldo Garcia¹

Jorge Sotomayor (born March 25, 1942 in Lima Perú) studied at the Universidad Nacional Mayor de San Marcos in Lima and graduated with a Bachelor's Degree in Mathematics in 1962. With the recommendation and encouragement of his teacher José Tola and with the support of Mauricio Peixoto, he received a scholarship to pursue graduate studies at the Instituto de Matemática Pura e Aplicada (IMPA, Rio de Janeiro). Under Peixoto's supervision, he earned his Ph.D. in 1964 with the dissertation, *Estabilidade Estrutural de Primeira Ordem e Variedades de Banach (First Order Structural Stability and Banach Manifolds)* [1], in which he presented a geometric reinterpretation and extension of the fruitful notions and results relating bifurcations and stability that were introduced by A. A. Andronov and E. A. Leontovich.

In his charming essay, *Uma lista de problemas de equações diferenciais* [10, 14], Sotomayor recounts his initiation to research in the *Seminar on the Qualitative Theory of Differential Equations*, organized by Peixoto at IMPA. This essay traces the evolution of mathematical ideas from the work of the Russian pioneers to Peixoto's Brazilian school of differential equations and dynamical systems and includes a discussion of the relationship of these new ideas with his own contributions.

Sotomayor visited the University of California at Berkeley during 1966–1968, where he witnessed the great developments in dynamical systems of that period which took place under the leadership of Stephen Smale.

In 1982, in collaboration with his first Ph.D. student C. Gutierrez, Sotomayor introduced the concept of structural stability to the study of the lines of principal curvature of a smooth surface embedded in Euclidean space [9]. The ideas leading to his work in this subject—traced back to the classical work of G. Monge, P. Dupin and G. Darboux—are discussed in his essay *Monge's Ellipsoid* [5, 14]. This research has been elaborated and extended in several directions by Sotomayor and his collaborators to include a large class of the differential equations of classical differential geometry (for example, the equations for asymptotic lines) and other classes of manifolds (for example, algebraic surfaces and surfaces in \mathbb{R}^4). In my Ph.D. thesis (IMPA, 1989), written under his supervision, I established the generic structure of the principal

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lines of curvature on hypersurfaces of \mathbb{R}^4 . Our paper [13] in this volume represents the culmination of one of these directions—the study of the lines of mean curvature, which also has remarkable connections with other classical subjects in geometry and analysis.

Sotomayor has collaborated with many distinguished mathematicians from abroad: F. Dumortier, C. Chicone, A. Gasull, J. Llibre, R. Roussarie and M. Zhitomirskii and others. His work goes far beyond the *qualitative theory of the differential equations of geometry*, a field that he helped to found; he has also made significant contributions to many other subjects: the geometry of inverse functions, nilpotent and homoclinic bifurcations, polynomial vector fields and their bifurcations, global asymptotic stability and constrained differential systems.

Sotomayor was elected to the Brazilian Academy of Sciences in 1993 and decorated by the Brazilian Government with the Great Cross for Scientific Merit in 1997.

During his mathematical career of almost forty years he has directed eight Master's dissertations and nineteen Ph.D. theses. He has also written many papers and some books. A list of selected references appears below with his approval. A generation of Brazilian mathematicians learned differential equations in his inspiring *Lições* [2].

After many years at IMPA, in 1993 he joined the faculty of the University of São Paulo, where he is presently a Professor of Applied Mathematics.

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