

Curriculum vitae

Christiane Rousseau

Département de Mathématiques et de Statistique and

Centre de Recherches Mathématiques

Université de Montréal

C.P. 6128, Succursale Centre-ville

Montréal, Québec

H3C 3J7, CANADA

Phone: (514) 343-7729

Fax: (514) 343-5700

Email: rousseac@dms.umontreal.ca

Born March 30 1954 in Versailles, France

Married to Serge Robert (one child).

Studies and Career

- Ph.D. Université de Montréal, 1977.
- Postdoc from CRSNG, Mc Gill University, 1977-79.
- Interim Professor at Université de Montréal, 1979-82.
- NSERC Research Fellow at Université de Montréal, 1982-87.
- Associate Professor at Université de Montréal, 1987- (Full Professor since 1991).
- Department Chair, 1993-97.
- Invited professor at Université de Bourgogne (one month in 1999-2000).
- Interim Director of CRM, September 2008-May 2009.

Refereed Publications

- 60. Bifurcation Analysis of a Generalized Gause Model with Prey Harvesting and a Generalized Holling Response Function of Type III, with Remy Magloire Etoua, to appear in J. Differential Equations.
- 59. The moduli space of germs of generic families of analytic diffeomorphisms unfolding of a codimension one resonant diffeomorphism or resonant saddle, J. Differential Equations, 248 (2010), 1794-1825.
- 58. Study of the cyclicity of some degenerate graphics inside quadratic systems, with Freddy Dumortier, Communications in Pure and Applied Analysis, 8, (2009), 1133-1157.
- 57. Bifurcation analysis of a predator-prey system with generalised Holling type III functional response, with Y. Lamontagne and C. Coutu, Journal of Dynamics and Differential Equations, 20, (2008), 535-571.
- 56. The Stokes phenomenon in the confluence of the hypergeometric equation using Riccati equation, with Caroline Lambert, Journal of Journal of Differential Equations, 244, (2008), 2641-2664.

- 55. Finite cyclicity of nilpotent graphics of pp-type surrounding a center, with Robert Roussarie, *Bulletin of the Belgian Mathematical Society - Simon Stevin*, 5, (2008), 889-920.
- 54. Analytical moduli for unfoldings of saddle-node vector-fields, with Loïc Teysier, *Moscow Mathematical Journal*, 8, (2008), 547-614.
- 53. The moduli space of germs of generic families of analytic diffeomorphisms unfolding a parabolic fixed point, with C. Christopher, *C. R. Acad. Sci. Paris, Ser. I* 345 (2007) 695-698.
- 52. Modulus of analytic classification for the generic unfolding of a codimension one resonant diffeomorphism or resonant saddle, with C. Christopher, *Annales de l'Institut Fourier*, 57, (2007), 301-360.
- 51. The root extraction problem, *Journal of Differential Equations*, 234, (2007), 110-141.
- 50. Modulus of orbital analytic classification for a family unfolding a saddle-node. Article on invitation for Ilyashenko's 60th birthday, *Moscow Mathematical Journal*, 5, (2005), 245-268.
- 49. Normalizable, integrable and linearizable saddle points in the Lotka-Volterra system, with C. Christopher, *Qualitative Theory of Differential Equations*, 5, (2004), 11-61.
- 48. Addendum to the paper "Modulus of analytic classification for unfoldings of generic parabolic diffeomorphisms", *Moscow Mathematical Journal*, 4, (2004), 499-502.
- 47. Modulus of analytic classification for unfoldings of generic parabolic diffeomorphisms. With P. Mardesic and R. Roussarie, *Moscow Mathematical Journal*, 4, (2004), 455-498.
- 46. Normalizability, synchronicity and relative exactness for vector fields in C^2 . With C. Christopher and P. Mardesic, *Journal of Dynamical and Control Systems*, 10, (2004), 501-525.
- 45. PP-graphics with a nilpotent elliptic singularity in quadratic systems and Hilbert's 16th problem. With H. Zhu, *J. Differential Equations*, 196, (2004), 169-208.
- 44. Normalizable, integrable and linearizable saddle points in complex quadratic systems in C^2 , with C. Christopher and P. Mardesic, *Journal of Dynamical and Control Systems*, 9, (2003), 311-363.
- 43. Finite cyclicity of elementary graphics surrounding a focus or center in quadratic systems, with F. Dumortier and A. Guzmán, *Qualitative theory of dynamical systems*, 3, (2002), 123-154.
- 42. Normal forms near a saddle-node and applications to finite cyclicity of graphics, with F. Dumortier and Y. Ilyashenko, *Ergodic theory and dynamical systems*, 22, (2002), 783-818.
- 41. Finite cyclicity of graphics with a nilpotent singularity of saddle or elliptic type, with H. Zhu, *J. Differential Equations*, 178, (2002), 325-436.
- 40. Finite cyclicity of finite codimension nondegenerate homoclinic loops with real eigenvalues in R^3 , with L.-S. Guimond, *Qualitative theory of dynamical systems*, 2, (2001), 151-204.
- 39. Non degenerate linearisable centres of complex planar quadratic and symmetric cubic systems in C^2 , with C. Christopher, *Publicacions Matemàtiques*, 45, (2001), 95-123.
- 38. Genericity conditions for finite cyclicity of elementary graphics, with A. Guzman, *J. Differential Equations*, 155, (1999), 44-72.
- 37. Global study of a family of cubic Liénard equations, with A. Khibnik and B. Krauskopf *Nonlinearity*, 11, (1998), 1505-1519.
- 36. Cyclicity of graphics with semi-hyperbolic points inside quadratic systems, with G. Swirszcz and H. Zoladek, *Journal of Dynamical Systems and Control*, 4, (1998), 149-189.

- 35. Codimension-three unfoldings of reflectionally symmetric vector fields, with B. Krauskopf, *Nonlinearity*, 10, (1997), 1115-1150.
- 34. Local bifurcations of critical periods in the reduced Kukles system, with B. Toni, *Jour. Canadien Math.*, 49, (1997), 338-358.
- 33. Darboux linearization and isochronous centers with a rational first integral, with P. Mardesic and L. Moser-Jauslin, *J. Differential Equations*, 134, (1997), 216-268.
- 32. A stratum of cubic vector fields with two symmetry axes passing through an integrable saddle, with L.-S. Guimond, *Nonlinearity*, 9, (1996), 761-785.
- 31. Hilbert's 16th problem for quadratic systems and cyclicity of elementary graphics, with F. Dumortier and M. El Morsalani, *Nonlinearity*, 9, (1996), 1209-1261.
- 30. Almost planar homoclinic loops in \mathbb{R}^3 , with R. Roussarie, *J. Differential Equations*, 126, (1996), 1-47.
- 29. The centers in the reduced Kukles system, with D. Schlomiuk and P. Thibaudeau, *Nonlinearity*, 8, (1995), 541-569.
- 28. Cubic vector fields symmetric with respect to a center, with D. Schlomiuk, *J. Differential Equations*, 123 (1995), 388-436.
- 27. Linearization of isochronous systems, with P. Mardesic and B. Toni, *J. Differential Equations*, 121, (1995), 67-108.
- 26. Elementary graphics of cyclicity 1 and 2, with F. Dumortier and R. Roussarie, *Nonlinearity*, 7, (1994), 1001-1043.
- 25. Hilbert's 16th problem for quadratic vector fields, with F. Dumortier and R. Roussarie, *J. Differential Equations*, 110, (1994), 86-133.
- 24. Local bifurcation of critical periods in vector fields with homogeneous nonlinearities of the third degree, with B. Toni, *Bull. Can. de Mathématiques*, 34, (1993), 473-484.
- 23. Bifurcations at infinity in polynomial vector fields, with T. Blows, *J. Differential Equations*, 104, (1993), 215-242.
- 22. Zeroes for complete elliptic integrals for 1:2 resonance, with H. Zoladek, *J. Differential Equations*, 94, (1991), 41-54.
- 21. Cubic Liénard equations with linear damping, with F. Dumortier, *Nonlinearity*, 3, (1990), 1015-1039.
- 20. A simple proof for the unicity of the limit cycle in the Bogdanov-Takens theorem, with C. Li and X. Wang, *Bull. Can. de Math*, 33, (1990), 84-92.
- 19. Codimension 2 symmetric homoclinic bifurcation and application, with Li Chengzhi, *J. Can. de Math*, 42, (1990), 191-212.
- 18. Codimension 1 and 2 bifurcations of fixed points of diffeomorphisms and of periodic solutions of vector fields, *Ann. Math. du Québec*, 13, (1989), 55-91.
- 17. Saddle quantities and applications, with P. Joyal, *J. Differential Equations*, 78, (1989), 374-399.
- 16. A system with three limit cycles appearing in a Hopf bifurcation and dying in a homoclinic bifurcation. The cusp of order 4, with Li Chengzhi, *J. Differential Equations*, 79, (1989), 132-167.
- 15. Elementary characterization of orbits and strata in the classical Lie and Jordan algebras. *Bull. Math. de la Soc. Math. de Roumanie*, 32, (1988), 75-88.

- 14. Generalized Hopf bifurcations and applications to planar quadratic systems. with D. Schlomiuk. *Ann. Pol. Math.*, 49, (1988), 1-16.
- 13. Clebsh-Gordan coefficients for SU(5) unification models. With M.A. del Olmo, J. Patera, M.A. Rodriguez. *J. Math. Phys.*, 20, (1987), 258-271.
- 12. Example of a quadratic differential system with 2 cycles appearing in a homoclinic loop bifurcation, *J. Differential Equations*, 66, (1987), 140-150.
- 11. Bifurcations methods in quadratic systems, *Canadian Mathematical Society Conference Proceedings*, vol. 8, (1987), 637-653.
- 10. Spectral decomposition theorem for symmetric matrices in topoi and applications. *J. Pure and Appl. Algebra*, 38, (1985), 91-102.
- 9. Clebsh-Gordan coefficients for E6 and SO(10) unification models,. with I.G. Koh and J. Patera. *J. Math. Phys.*, 25, (1984), 2863-2872.
- 8. Clebsh-Gordan coefficients for SU(5) 2 SU(3) x SU(2) x U(1) theories, with I.G. Koh and J. Patera. *J. Math. Phys.*, 24, (1983), 1955-1967.
- 7. Versal deformations of elements of classical Jordan algebras, with J. Patera, *J. Math. Phys.*, 24, (1983), 1375-1380.
- 6. Complex orthogonal and symplectic matrices depending on parameters, with J. Patera, *J. Math. Phys.*, 23, (1982), 705-714.
- 5. Dimensions of orbits and strata in complex classical Lie algebras, with J. Patera and D. Schlomiuk, *J. Math. Phys.*, 23, (1982), 490-494.
- 4. Versal deformations of elements of real classical Lie algebras, with J. Patera and D. Schlomiuk, *J. Phys. A*, 15, (1982), 1063-1086.
- 3. Formes normales des matrices rectangulaires dans un topos and applications, *Ann. Math. du Québec*, 5, (1981), 81-85.
- 2. Nombres réels et complexes dans les topos spatiaux, *Ann. Math. du Québec*, 3, (1979), 143-159.
- 1. Topos theory and complex analysis, *J. Pure and Appl. Algebra*, 10, (1977), 299-313.

Refereed papers in Proceedings

- 5. Normal forms for germs of analytic families of vector fields unfolding a generic saddle-node or resonant saddle, *Nonlinear dynamics and evolution equations*, 227--245, *Fields Inst. Commun.*, 48, *Amer. Math. Soc.*, Providence, RI, 2006.
- 4. Hilbert's 16-th problem for quadratic vector fields and cyclicity of graphics, *Proceedings of the Second World Congress of Nonlinear Analysts*, (Athens, 1996), *Nonlinear Analysis, Theory, Methods and Applications*, 30 (1), (1997), 437-445.
- 3. Universal unfolding of a singularity of a symmetric vector field with 7-jet C^∞ -equivalent to $y \partial/\partial x + (\pm x^3 \pm x^6 y) \partial/\partial y$, *Proceedings of the Luminy Workshop "Bifurcations and periodic orbits of vector fields"*, *Springer Lecture Notes in Math.*, 1455, (1992), 334-355.
- 2. Topos theory and complex analysis, *Proc. on the Durham Symp. on Applications of sheaves 1977*, *Springer Lecture Notes in Math.*, 753, (1979), 623-659.
- 1. Complex structures on topoi, *Proc. of Aarhus Meeting 1978*, *Aarhus Publ. Ser.*, 30, (1979), 196-210.

Chapters of monographies

- Bifurcation methods in polynomial systems, Proceedings of the Nato Advanced Study Institute (Séminaire de Mathématiques Supérieures), “Bifurcations and periodic orbits of vector fields”, 1992, 50 pages, Kluwer editor, 1993.
- Normal forms, bifurcations and finiteness properties of vector fields, dans “Normal forms, bifurcations and finiteness properties of vector fields”, NATO Science Series II : Mathematics, Physics and Chemistry, 137. Kluwer Academic Publishers, Dordrecht, 2004, 431-470.

Editor of a book

- Editor with Y. Ilyashenko and G. Sabidussi de “Normal forms, bifurcations and finiteness problems in differential equations”, Proceedings of the Séminaire de mathématiques supérieures, NATO Science Series II : Mathematics, Physics and Chemistry, 137. Kluwer Academic Publishers, Dordrecht, 2004.

Prizes and distinctions

- Prix Abel-Gauthier 1999 from AMQ (association mathématique du Québec), for the personality of year 1999.
- Regular lecture at ICME-11 (11th International Conference on Mathematics Education), Monterrey, Mexico, July 2008.
- Invitation to a panel "Communicating Mathematics to Society at large" at ICM 2010.
- Teaching prize from Université de Montréal for the best academic book, with Yvan Saint-Aubin, 2009.
- Adrien-Pouliot prize from AMQ (association mathématique du Québec) for the book “Mathématiques et technologie”, with Yvan Saint-Aubin, 2009.

Learned Societies

- Member of Canadian Mathematical Society.
- Member of Canadian Applied and Industrial Mathematical Society.
- Member of American Mathematical Society.
- Member of Association Mathématique du Québec.

Administrative positions in learned societies

- Vice-president of Canadian Mathematical Society, 1995-97.
- President elect of Canadian Mathematical Society, 2001-2002, President, 2002-2004, Past-President, 2004-2005.
- Member of the Canadian Delegation to the General Assembly of the IMU, Shanghai, August 2002.
- Member of CRM Board: 1997-2008.
- Member of the Canadian Delegation to the General Assembly of the IMU, Santiago de Compostelle, August 2006.
- Chair of the CNC-IMU Committee, Canada, 2006-2008.

Books

- Mathématiques et technologie, with Yvan Saint-Aubin, Springer Undergraduate Texts in Mathematics and Technology, Springer, New York, 2008, 594p.

- Mathematics and technology, with Yvan Saint-Aubin, Springer Undergraduate Texts in Mathematics and Technology, Springer, New York, 2008, 580p.

Organization of conferences and special sessions

- Organization of a workshop in Luminy, May 2009 « Singularities of planar vector fields, bifurcations and applications » (with Pavao Mardesic).
- Organization of the Canadian bid for ICM 2014 in Montreal.
- Organization of the thematic semester “Dynamical systems and evolution equations” winter 2008 at CRM (with Walter Craig).
- Organization of a workshop « Mathematical developments around Hilbert’s 16th problem », BIRS, March 2007.
- Organization of the Canadian bid for ICM 2010 in Montreal.
- Organization of a session « Dynamical systems » in th first France-Canada meeting, Toulouse, 2004, with Robert Roussarie.
- Organization workshop in Luminy, for R. Roussarie 60-tj birthday, with P. Mardesic, June 2004.
- Organization of a Canada School Mathematics Forum for the Canadian Mathematical Society, Scientific co-President , Montreal, 2003.
- Organization of the Nato Advanced Study Institute (Séminaire de mathématiques supérieures) with Y. Ilyashenko, « Normal forms, bifurcations and finiteness problems in differential equations », July 2002 (and 4 lectures).
- Organization of a colloquium « Nonlinear dynamics and mathematical biology », Entretiens Jacques-Cartier 2000, Montréal.
- Organization of the first Job Fair at the Canadian Mathematical Society Meeting, Montreal, December 1999 .
- Organization of a special session « Dynamical systems » at the Canadian Mathematical Society Meeting, Montreal, December 1999 .
- Organization of a workshop « Algebraic and geometric methods in planar vector fields » , CRM, January 1999, with Dana Schlomiuk .
- Organization of the thematic semester winter 2004 at CRM “Bifurcations and periodic orbits of vector fields”.
- Organization of a workshop “Qualitative theory of vector fields” at CRM, June 1989, with Pierre Joyal.
- Organization of a workshop “Generic families of vector fields” at CRM, June 1987, with J. Bélair.

Graduate students

- Waldo Arriagada-Silva, Ph.D 2006-.
- Remy Etoua, Ph.D. 2008 .
- Yann Lamontagne, master, 2006.
- Caroline Lambert, master 2004.
- Caroline Lambert, Ph.D., 2010.
- Caroline Coutu, master, 2003.
- Jean-Philippe Lessard, master, 2002.

- Huaiping Zhu, Ph.D., 1999.
- Louis-Sébastien Guimond, Ph.D. 1999. Co-supervision with Robert Roussarie.
- Bourama Toni, Ph.D., 1994.
- Luciano Buono, master, 1994.
- Louis-Sébastien Guimond, master, 1994
- Pierre Joyal, Ph.D., 1987

Summer students with research scholarships from NSERC

- Sophie Laurin, 2008.
- Philippe Carphin, 2008.
- Isabelle Ascah-Coallier, 2004.
- Hélène Antaya, 2004
- Hélène Antaya, 2003
- Raymond Aziz Elmadahoui, 2002.
- Simon Gravel, 2000 (« Integrability and linearizability of the Lotka-Volterra system with a resonant saddle point », with P. Thibault, J. of Differential Equations, **184** (2002), 20-47).
- Pierre Thibault, 2000 (« Integrability and linearizability of the Lotka-Volterra system with a resonant saddle point », with S. Gravel, J. of Differential Equations, **184** (2002), 20-47).
- Alexandre Girouard, 1999.
- Philippe Larocque, 1995.
- Philippe Poyet, 1992
- Pina Marziliano, 1992.
- Mathieu Gagné, 1990,
- Pierre Bonin, 1986, (“Comparaison de la méthode des constantes de Lyapunov et de la bifurcation de Hopf”, Can. Math. Bull. 1988, with J. Legault.)
- Josée Legault, 1986, (“Comparaison de la méthode des constantes de Lyapunov et de la bifurcation de Hopf”, Can. Math. Bull. 1988, with G. Bonin.)

Postdocs

- Li Chengzhi (Peking University), winter 1987.
- Nikolay Bykov, 1995-96.
- Ana Guzman, 1996-97.
- Yulin Zhao, Fall 2002.
- Luciano Buono, 2003-04.
- Denis Gaydashev, winter 2008.
- Nikolay Dimitrov, co-advisor, 2009-2011

Editorial boards

- Annales des sciences mathématiques du Québec, 2000-2008.
- Accromath, 2007-

Activities in education and popularization of maths

Other refereed publications

- 6. Les dessous de la cryptographie à clé publique, Bulletin AMQ, October 2005.
- 5. Mathématiques et technologie, Bulletin AMQ, October 2002, 23-35.
- 4. La théorie des nœuds, Bulletin AMQ, October 1998, 14-21.
- 2. Le mathématicien, un créateur, Bulletin AMQ, May 1997, 28-35.
- 2. Des fractals utiles. With J. Bélair. Bulletin AMQ, October 1989, 5-8.
- 1. Les nouvelles mathématiques appliquées. With J. Bélair. Bulletin AMQ, October 1987, 9-20.

Other publications

- 23. Fin du pétrole? Un peu d'imagination!, Accromath 4, summer-fall 2009
www.accromath.ca
- 22. Mystérieuse lithographie d'Escher, with Philippe Carphin, Accromath 4, summer-fall 2009.
- 21. Nautilé, Nombre d'or et spirale dorée, Accromath 3, summer-fall 2008.
- 20. Spirales végétales, with Redouane Zazoun, Accromath 3, summer-fall 2008.
- 19. Cartographie, Accromath 3, winter-spring 2008.
- 18. Polyèdres et fullerènes, Accromath 2, summer-fall 2007.
- 17. Les miroirs ardents, with Yvan Saint-Aubin, Accromath 1, winter-spring 2007.
- 16. Ou suis-je? Accromath 1, summer-fall 2006, 2-5.
- 15. Le signal du GPS, Accromath 1, summer-fall 2006, 6-9.
- 14. Le positionnement sur la Terre et dans l'espace, Proceedings of the AMQ Congress, Montréal, 2005.
- 13. Les dessous de la cryptographie à clé publique, Proceedings of the AMQ Congress, Lévis, 2004.
- 12. Mathématiques et technologie, Proceedings of the AMQ Congress, Montréal, 2001.
- 11. Mathematics and technology, Proceedings of CMESG Annual meeting (Canadian study group in mathematical education), May 2001.
- 10. 9. Théorie des nœuds et chaînes d'ADN, in « Mathématiques d'hier et d'aujourd'hui » (Collectif mathématique 2000) published at Modulo Éditeur. The authors of these collective volume received a prize from the AMQ for their contribution to popularization of maths
- 8. Systèmes dynamiques, chaos et ordinateurs, Proceedings of the AMQ Congress, Sherbrooke, October 1999.
- 7. La théorie des nœuds en science, Proceedings of the AMQ Congress, Montréal, October 1998.
- 6. La théorie des nœuds, Proceedings of the AMQ Congress, Trois-Rivières, October 1997.
- 5. Le mathématicien, un créateur, Proceedings of the AMQ Congress, Rivière-du-Loup, October 1996.
- 4. Des polyèdres à la géométrie différentielle, Gazette des Sciences Mathématiques du Québec, December 1994, 31-42.
- 3. Structure géométrique de la singularité essentielle $e^{1/z}$, with P. Mardesic, Gazette des Sciences Mathématiques du Québec, December 1993, 3-4.
- 2. Le 16e problème de Hilbert, Gazette des Siences Mathématiques du Québec, April 1989, 39-47.

- 1. Le système solaire est-il stable?, Gazette des Sciences Mathématiques du Québec, April 1988.

Lectures in cegeps or colleges

- Two or three lectures in cegeps or colleges per year
- Presentation at the annual congress of the AMQ (Association mathématique du Québec) almost every year since 1996.
- Co-organizer of a science day for cegep professors in June 1998.

Lectures for undergraduate university students

- Plenary lecturer for the CUMC (Canadian Undergraduate Mathematics Conference), 1994 and 2001.

Popularization activities

- Organization with Yvan Saint-Aubin of the Grandes Conférences of CRM (public lectures at CRM) since 2006.
- Participation at a panel and a working group at the second Canada School Mathematics Forum, Toronto, May 2005.
- Plenary lecture at CMESG (Canadian mathematical education study group) « Mathematics and technology », Edmonton, May 2001.
- Scientific President and judge for the super Expo-Sciences Bell 2001, Montréal, April, 2001.
- Co-organizer of a Forum at the congress of ACFAS « La formation des professeurs de sciences au secondaire », May 2001.
- Participation at a round table at the radio program « Les années lumière » at Radio-Canada on the training of future high-school teachers, 2001.
- Conference at the scientific café of UQAM « Les mathématiques, la plus universelle des langues », , May 2000.
- Panelist at the 2000 SWAAC (senior women academic administrators of Canada), Montreal, April 2000 .
- Participation to the TV series « C'est mathématique » at canal Z March 2000.
- Operation Métro-2000: organizer of the poster campaign in the Montreal subway in January 2000 for WMY 2000.
- Collaboration in the preparation of a mathematical exhibition « 1, 2, 3, math... », with the Musée du séminaire de Sherbrooke and AMQ, 1999.

Organization or animation of mathematical camps

- Organization of the mathematical camp of AMQ (Association mathématique du Québec) with A. Giroux, University of Montreal, 1994-97. Camp Mathématique de l'AMQ à l'UQAM "Théorie des nœuds", mai 2004.
- Animation for one day at the mathematical camp of AMQ in 1989, 1994, 1996, 1997, 2000, 2001, 2002, 2003.