

AREAS OF RESEARCH AND LIST OF PUBLICATIONS

Prof. JIAN-JUN XU (Ph.D)

Department of Mathematics and Statistics
McGill University
805 Sherbrooke Street West
Montreal, QC. H3A 2K6, CANADA.

Telephone: (514) 398-3849 (Office) ; (514) 768-9921 (Home)
Fax: (514) 398-3899; E-Mail: xu@math.mcgill.ca
(March, 2011)

I. Specialty

Applied Mathematics, Asymptotics and Numerical Analysis, Dynamical Systems of Non-Linear PDE with particular emphasis in the areas of interfacial pattern formation dynamics in material science, condensed matters physics, crystal growth and fluid dynamics.

II. Areas of Research

1963-1976: Applied mathematical problems in chemical engineering: physico-chemical hydrodynamics, fluidization, fluid dynamical instabilities,

1976-1980; 1983-1984: Applied mathematical problems in astro-physics: formation of spiral structure of galaxies, etc.

1978-1981: Applied mathematical problems in chemical engineering: physico-chemical hydrodynamics, fluidization, fluid dynamical instabilities, etc. Applied mathematical problems in astro-physics: formation of spiral structure of galaxies, etc.

1981-1983: Crystal growth; Micro-gravity science and Magneto-hydrodynamics: floating zone technique in crystal growth, thermo-capillary instability of liquid bridge, etc.

1985-2004: Some fundamental theoretical problems in condensed matters physics, material science and fluid dynamics: phase transition, dendritic growth in solidification, interfacial instabilities, viscous fingering formation in Hele-Shaw flow, pattern formation in non-equilibrium systems, etc.

2004-present: Mathematical material science and mathematical biology.

III. Publications

(A) Research Monographs:

1. J.J. Xu, “**Introduction of Dynamical Theory of Solidification and Interfacial Instabilities**” (in Chinese), published by Chinese Academy Press, (235 pages) (2006).

2. J.J. Xu, “**Dynamical Theory of Dendritic Growth in Convective Flow**”, published by Springer Publisher in the series of *Advances of Mechanics and Mathematics*, (240 pages) (2004).
3. J.J. Xu, “**Dynamics of Dendritic Growth Interacting with Convective Flow — Global Instabilities and Limiting State Selection**”, *Advances in Mechanics and Mathematics* (AMMA-2002), Vol. 1, pp. 113–301 (2002).
4. J.J. Xu, “**Dynamics of Dendritic Crystal Growth Interacting with Convective Flow**”, Notebook for the State Key Laboratory of Crystal Growth, Shandong University, China, (200 pages) (2001).
5. J.J. Xu, “**Interfacial Wave Theory of Dendritic Crystal Growth — Global Instabilities and Selection of Limiting State**”, Japanese Space Agency (NASDA) Report, Japan, (238 pages) (2000).
6. J.J. Xu, “**Interfacial Wave Theory of Pattern Formation: Selection of Dendritic Growth and Viscous Fingering in Hele-Shaw Flow**”, Springer-Verlag Publisher in the series of *Synergetic*, (296 pages) (1998).
7. J.J. Xu, “**Viscous Fingering Formation in Porous Medium**”, *Tamkang Chair Lecture Series 113*, Tamkang University Press, September, (82 pages) (1996).

(B) Articles in Books :

8. J.J. Xu, “Dendrites, Fingers, Interfaces and Free Boundaries”, in the book ‘Boundaries, Interfaces and Transitions’, edited. by M. Delfour, AMS Publisher, pp. 265–343, (1997).
9. J.J. Xu, “Interfacial Instability Theory of Hele–Shaw Flow”, in the Book ‘Mathematics is for Solving Problems’, in honor of Julian D. Cole on his 70th birthday, edited by L. Pamela Cook, Victor Roytburd and Marshal Tulin, SIAM, pp. 92–101, (1996).
10. J.J. Xu, “Global Interfacial Instability and Dendritic Pattern Formation” (a review article) in the Book ‘Current Topics in Crystal Growth Research’, edited by the Council of Scientific Information of India, pp. 205–230, (1995).
11. J.J. Xu, “The Effect of Convection Motion on Dendritic Growth”, in the book ‘Interactive Dynamics of Convection and Solidification’, NATO ASI series E: Applied Science – Vol. 219, edited by Davis et al., Kluwer Academic Publishers. Printed in the Netherlands, pp. 101–103, (1992).
12. J.J. Xu, “Global Asymptotic Solution For Axi-symmetric Dendritic Growth with Small Undercooling”, in the book, ‘Structure and Dynamics of Partially Solidified Systems’, NATO ASI Series E: Applied Science – No: 125, edited by D.E. Loper, Martinus Nijhoff Publishers, Dordrecht, printed in The Netherlands, pp. 95–109, (1987).

(C) Refereed Journal Publications:

13. J.J. Xu, and Y.Q. Chen, “Global Stabilities, Selection of Steady Cellular Growth and Origin of Side-branches in Directional Solidification”, *Physical Review E*, **83**, 061605 (2011).
14. Y.Q. Chen, and J.J. Xu, “Global Theory of Steady Deep-Cellular Growth in Directional Solidification”, *Physical Review E*, **83**, 041601 (2011).
15. Y.Q. Chen, and J.J. Xu, “Steady Deep-Cellular Growth in Solidification”, *J. Crystal Growth*, **318**, pp. 32-35, (2011);
<http://dx.doi.org/10.1016/j.jcrysgro.2010.10.140>
16. J.J. Xu, and Y.Q. Chen, “Global Instability and Selection of Cellular Array Growth in Solidification”, (Accepted for publication in *J. Crystal Growth*, **318**, pp. 28-31, (2011);
<http://dx.doi.org/10.1016/j.jcrysgro.2010.10.142>)

17. Y.Q. Chen X.X. Tang and J.J. Xu, “3D Interfacial Wave Theory of Dendritic Growth: (I). Multiple Variables Expansion Solutions”, Chinese Physics B (English version), Vol. 18, No2, pp. 671-685, (2009).
18. Y.Q. Chen X.X. Tang and J.J. Xu, “3D Interfacial Wave Theory of Dendritic Growth: (II). Non-Axi-Symmetric Global Wave Modes and Selection of Pattern Formation”, Chinese Physics B (English version), Vol. 18, No2, pp. 686-698, (2009).
19. M.W. Chen, M. Lan, Y.Y. Wang, Z.D. Wang and J.J. Xu, “The Effect of Anisotropic Surface Tension on the Morphological Stability of Planar Interface during Directional Solidification”, Chinese Physics B, Vol. 18, No: 4, pp. 1691-1699, (2009).
20. Wang Z. D., Wang Xuewen, Wang Qiangsong, Shih I, Xu J. J., “Fabrication of a Nanocomposite from in situ Iron Nanoparticle Reinforced Copper Alloy”, Nanotechnology, vol. 20: 075605, pp. 1–6, (2009).
21. X.J. Chen, Y.Q. Chen, J.P. Xu and J.J. Xu, “Steady Needle Growth with 3D Anisotropic Surface Tension”, Front. Phys. in China, Vol. 3, No: 4, pp. 418–435, (2008).
22. M.W. Chen, Z.D. Wang and J.J. Xu, “The steady-state solution of dendritic growth from the undercooled binary alloy melt with the far field flow”, Science in China, Series G: Phys. Mech. Astron. (Chinese version), Vol. 38, pp. 1900–1911, (2008). (Its English version to appear in 2009)
23. Y.Q. Chen and J.J. Xu, “The Dynamical Theory on Solidification of Liquid Droplets”, Chinese Journal of Theoretical and Applied Mechanics, Vol. 40, No. 3, pp. 297–305, (2008).
24. M.W. Chen, Z.D. Wang, and J.J. Xu, “The Effect of Far Field Flow on Spherical Crystal Growth in the Undercooled Melt”, ACTA Mechanica Sinica (Chinese J. of Theor. and Appl. Mech.), Vol. 24, No: 6, pp. 681-689, (2008).
25. M.W. Chen, Z.D. Wang and J.J. Xu, “The evolution and morphological stability of a spherical crystal”, Science in China Series E: Technological Sciences, 2008, 51 (3) : pp. 225–243 (2008).
26. M.W. Chen, H. Zhang, Z.D. Wang, J.X. Xie and J.J. Xu, “Short-wave instabilities of the rapid solidification interface in the hypercooled melt with a uniform shear flow”, (Submitted to J. of Crystal Growth, Sept. 2008).
27. M.W. Chen, Z.D. Wang, J.X. Xie and J.J. Xu, “The asymptotics of steady state dendritic growth from an undercooled binary alloy melt influenced by buoyancy-driven convection”, (Submitted to Science in China Series A: Mechanics, 2008).
28. J.Q. Chu, W.P. Jiao and J.J. Xu, “Mathematical Modeling Study for Water Uptake of Steadily Growing Plant Root”, Science of China, Series G: Phys. Mech. Astron., Vol. 51, No. 2, (Feb. 2008)
29. M.W. Chen, Z.D. Wang and J.J. Xu, “Morphological stability and evolution of a spherical crystal in the undercooled pure melt”, Science in China, Series G: Phys. Mech. Astron., Vol. 37, pp. 644–660, (2007).
30. J.J. Xu, Invited review article: “Mathematic-Physical Modelling Investigation on Dynamical Process of Growth, Development and Evolution of Plants”, *J. of Advances of Mechanics*, Vol. 33, No: 2, pp. 161–169, (2006)
31. J.J. Xu, “Studies of Interaction of Convective Flow with Free Dendritic Growth”, *J. Crystal Growth*, 292, pp 523–527, (2006)
32. J.J. Xu and J. Schimizu, “Asymptotic Theory of Disc-like Crystal growth: (I). Basic State Solution”, Discrete and Continuous Dynamical Systems – Series B, Vol. 4, No: 4, pp. 1091–1116, (2004).

33. J.J. Xu and J. Schimizu, “Asymptotic Theory of Disc-like Crystal growth: (II). Interfacial Instability and Patter Formation at Early Stage of Growth”
Communication on Pure and Applied Analysis, Vol. 3, No: 3, pp. 527–543, (2004)
34. J.J. Xu, “Stability and Selection of Dendritic Growth with Anisotropic Kinetic Attachment”
J. Crystal. Growth, 245, pp. 134–148, (2002).
35. J.J. Xu, and D.S. Yu, “Selection and Resonance of Dendritic Growth with Interference of Oscillatory External Sources”,
J. of Crystal Growth, 226, pp. 378–392, (2001).
36. J.J. Xu and D.S. Yu, “Further Examinations of Dendritic Growth Theories”,
J. of Crystal Growth, 222, pp. 399–413, (2001).
37. J.J. Xu and D.S. Yu, “Examinations of Dendrite Growth Theories with some Latest Numerical Simulations and Experimental Data”,
J. of Crystal Growth, Vol. 198, No: 43, pp. 43–48, (1999).
38. D.S. Yu and J.J. Xu, “Dendrite Growth in External Flow: The Selection of Tip Velocity”,
J. of Crystal Growth, Vol. 198, No: 49, pp. 49–55, (1999).
39. J.J. Xu and D.S. Yu, “Regular Perturbation Expansion Solution For Generalized Needle Crystal Growth”,
Journal of Crystal Growth, 187, pp. 314–326, (1998).
40. J.J. Xu, “Generalized Needle Solutions, Interfacial Instabilities and Pattern Formations”,
The Physical Review (E), Vol. 53, No: 5, pp. 5051–5062, (1996).
41. J.J. Xu, “Global Interfacial Instabilities and Selection of Dendrite Growth”,
Journal of Crystal Growth, 166, pp. 201–206, (1996).
42. J.J. Xu, “Interfacial Instabilities and Fingering Formation in Hele-Shaw Flow”,
IMA Journal of Applied Mathematics, 57, pp. 101–135, (1996).
43. J.J. Xu, “Interfacial Wave Theory for Oscillatory Finger’s Formation in a Hele-Shaw Cell: a Comparison with Experiments”
European Journal of Applied Mathematics, Vol. 7, pp. 169–199, (1996).
44. J.J. Xu, “Effect of Convection Motion in Melt Induced by Density-Change on Dendritic Solidification”,
Canadian Journal of Physics, Vol. 72, No: 3&4, pp. 120–125, (1994).
45. J.J. Xu, “Dendritic Growth From Melt with External Flow: Uniformly Valid Asymptotic Solution of Steady State”,
Journal of Fluid Mechanics, Vol. 263, pp. 227–243, (1994).
46. J.J. Xu, “Uniformly Valid Asymptotic Solution for Steady dendrite Growth in External Flow”,
J. Crystal Growth, No: 128, pp. 219–223, (1993).
47. J.J. Xu and Z.X. Pan, “Interfacial Wave Theory of Dendritic Growth From a Binary Mixture: A Comparison with Experiments”,
J. Crystal Growth, No: 129, pp. 666–682, (1993).
48. J.J. Xu, “Global Instability and Pattern Formation in Dendritic Solidification of Dilute Binary Alloy System”,
The Canadian Applied Mathematics Quarterly, Vol. 1, No: 2, pp. 255–292, (1993).
49. Xu-finger-91 J.J. Xu, “Global Instability of Viscous Fingering in Hele-Shaw Cell (I) — Formation of Oscillatory Fingers”,
European Journal of Applied Mathematics, Vol. 2, pp. 105–132, (1991).

50. J.J. Xu, "Interfacial Wave Theory of Two-Dimensional Dendritic Growth with Anisotropy of Surface Tension",
The Canadian Journal of Physics, Vol. 69, No: 7, pp. 789–800, (1991).
51. J.J. Xu, "Two-Dimensional Dendritic Growth with Anisotropy of Surface Tension",
Physics (D), 51, pp. 579–595, (1991).
52. J.J. Xu, "Interfacial Wave Theory of Solidification — Dendritic Pattern Formation and Selection of Tip Velocity",
The Physical Review A 15., Vol. 43, No: 2, pp. 930–947, (1991).
53. J.J. Xu, "Asymptotic Theory of Steady Axi-symmetric Needle-like Crystal Growth",
Studies of Applied Mathematics, 82, pp. 71–91, (1990).
54. J.J. Xu, "Interfacial Wave Theory of Dendrite Growth: Global Mode Solution and Quantum Condition",
The Canadian Journal of Physics, Vol. 68, No: 1, pp. 58–66, (1990).
55. J.J. Xu, "Global Neutral Stable State and Selection Condition of Tip Growth Velocity",
J. Crystal Growth, 100, pp. 481–490, (1990).
56. J.J. Xu, "Global Wave Mode Theory for Formation of Dendritic Structure On a Growing Needle Crystal",
Physica Status Solidi (b), 157, PP. 577–591, (1990).
57. J.J. Xu, "Interfacial Wave Theory for Dendritic Structure of a Needle Crystal (II) – Wave Emission Mechanism at the Turning Point",
The Physical Review A, Vol. 40, No: 3, pp. 1609–1614, (1989).
58. J.J. Xu, "Interfacial Wave Theory for Dendritic Structure of a Needle Crystal (I) – Local Instability Mechanism",
The Physical Review A, Vol. 40, No: 3, pp. 1599–1608, (1989).
59. J.J. Xu, "Asymptotic Behavior of Steady Dendritic Growth at Far Field",
The Physical Review A, Vol. 37, No: 8, p. 3087–3095, (1988).
60. J.J. Xu and J.T. Woo, "Asymptotic Solution of Magnetohydrodynamic Flow Between Two Rotating Disks With Small Gap",
Physics of Fluids, Vol. 30, No: 12, p. 3801–3808, (1987).
61. J.J. Xu, "On Propagation and Evolution of Density Waves on a Galactic Disk (II)",
Sientia Sinica, Vol. 29, No: 1, pp. 67–77, (1986).
62. J.J. Xu, "Evolution and Propagation of Density Waves on Galactic Disk (I)",
Sientia Sinica, Vol. 28, No: 11, pp. 1192–1207, (1985).
63. J.J. Xu and S.H. Davis, "Liquid Jet with Thermo-Capillarity",
J. Fluid Mech. Vol. 161, PP. 1–25, (1985).
64. J.J. Xu and S.H. Davis, "Convective Thermo-Capillary Instability in Liquid Bridges",
Physics of Fluids, Vol. 27, No: 5, pp. 1102–1107, (1984).
65. J.J. Xu, "Steady Axi-symmetric Thermo-Capillary Motion of Short Melting Column",
Scientia Sinica, No: 4, pp. 372–391, (1984).
66. J.J. Xu and S.H. Davis, "Liquid Bridges with Thermo-Capillarity",
Physics of Fluids, Vol. 26, No: 10, pp. 2880–2886, (1983).
67. J.J. Xu, "One-Dimensional Mathematical Model on the Peculiar Gathering Behavior of Particles in a Rotating Loop",
Acta Mechanica Sinica, No: 1, pp. 91–94, (1983).

68. J.J. Xu, “The Permanence of Density Waves of Galaxy and Numerical Investigation of ‘WASER’ Mechanism”,
Scientia Sinica, Vol. 25, No: 2, pp. 191–202, (1982).
69. J.J. Xu, “A Hydrodynamic Theory of Three-Dimensional Density Waves for Spiral Structure of Galaxies (II) – Global Mode Solution and Effect of Thickness”
Scientia Sinica, Vol. 23, No: 12, pp. 1545–1558, (1980).
70. J.J. Xu, “A Hydrodynamic Theory of Three-Dimensional Density Waves for Spiral Structure of Galaxies (I) – Local Solution and Discussion of Local Jean’s Instability”,
Acta Mechanica Sinica, No: 3, (1980).
71. J.J. Xu, “On Approximate Analytical Solution of Poisson’s Equation for Inner region of Galaxy Disk with Finite Thickness”, A Monthly Journal of Science, Vol. 25, No: 9, pp. 748–754, (1980).
72. J.J. Xu, “Tunnel Effect on Density Waves of Galaxies at Co-rotation Circle and Switch Character of ‘WASER’ Mechanism”,
Scientia Sinica, No: 8, pp. 992–1005, (1980).
73. J.J. Xu, “Gravitational Instability of Loosely Wound Spiral Density Waves of Galaxies”,
A Monthly Journal of Science, Vol. 25, No: 9, pp. 77–81, (1980). (Chinese version, No: 2, pp. 77–81, 1980.)
74. J.J. Xu, “On Loosely Wound Spiral Density Waves of Galaxies”,
Scientia Sinica, Vol. 22, No: 7, pp. 806–818, (1979).
75. J.J. Xu, “On the Basic State of Disc Galaxy with Finite Thickness”,
Acta Astronomica Sinica, Vol. 20, No: 3, pp. 246–253, (1979).
76. J.J. Xu, “The Mathematical Modeling of Dynamical Process of Chemical Transport”,
Acta Mechanica Sinica, No: 5, pp. 333–343, (1978).
77. J.J. Xu, “On Unsymmetrical Deposition Motion of Aerosol Particles in a Tube”,
Acta Mechanica Sinica, No: 4, pp. 288–301, (1978).

(D) Other Refereed Publications, and Articles in Proceedings:

78. J.J. Xu and Y.N. Huang, “*Global Instability, Limiting-State Selection and Nonlinear Pattern Formation*”,
Proceedings of the Second International Conference on Nonlinear Science (Dynamics Days Asian-Pacific)
held at Zhejiang University, China, August 8–12, 2002.
79. J.J. Xu, “Interfacial Pattern Formation in Nonlinear Dynamic Systems: Dendrites, Fingers and Interfacial Waves”, in the book, ‘Nonlinear Analysis, Theory and Applications, Vol. 30, No: 5, pp. 2775–2786, (1997) — Proceedings of the Second World Congress of Nonlinear Analysts’, Athem, Greece, July 1–17, 1996’,
edited by V. Lakshmikantham, published by Pergamon, Elsevier Science Ltd. Printed in Great Britain, 1997.
80. J.J. Xu, “Interfacial Wave Theory of Dendritic Growth and a Comparison with Experiments”, in the
Book, ‘World Congress of Nonlinear Analysts’ 92 — Proceedings of the First World Congress of Nonlinear
Analysts, Tampa, Florida, August 19–26, 1992’, edited by V. Lakshmikantham, pp. 3929–3940, published
by Water de Gruyter, Berlin, New York, (1996).
81. J.J. Xu, “Generalized Needle Solutions, Interfacial Instabilities and Pattern Formation”, Report from
Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 95-09, (43 pages) (1995).
82. J.J. Xu, “Interfacial Wave Theory for Oscillatory Finger’s Formation in a Hele–Shaw Cell: a Comparison
with Experiments”, Report from Department of Mathematics and Statistics, McGill University, ISSN
0824-4944, 94-01, (48 pages) (1994).

83. J.J. Xu, “Interfacial Wave Theory of Pattern Formation”, Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 94-02, (13 pages) (1994).
84. J.J. Xu and P.J. Scott, “Thermo-capillary Stability Limit for Liquid Bridges in Microgravity”, Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 94-05, (28 pages) (1994).
85. J.J. Xu, “Global Interfacial Instabilities and Dendritic Pattern Formation”, Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 94-10, (47 pages) (1994).
86. J.J. Xu and Z.X. Pan, “Numerical Investigation of Global Instability Mechanism of Dendrite Growth”, Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 93-05, (23 pages) (1993).
87. J.J. Xu and Z.X. Pan, “Interfacial Wave Theory of Dendritic Growth from a Binary Mixture: A Comparison with Experiments”, Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 92-02, (50 pages) (1992).
88. J.J. Xu, “Effect of Convection Motion in Melt Induced by Density Change on Dendritic Growth”, Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 92-06, (35 pages) (1992).
89. J.J. Xu and Z.X. Pan, “Dendritic Growth from the Melt in an External Flow: Unsteady Global Modes Solution”, Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 92-12, (37 pages) (1992).
90. J.J. Xu, “Interfacial Traveling Waves in Solidification of Binary Alloy System”, Proceedings of CAM meeting, (1990).
91. J.J. Xu, “Dendritic Growth from Melt with External Flow (I): Uniformly Valid Asymptotic Solution of Steady State”, Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 91-23, (23 pages) (1991).
92. J.J. Xu, “Interfacial Wave Theory on Formation of Dendritic Structure in Binary Alloy System”, Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 91-08, (9 pages) (1991).
93. J.J. Xu, “Global Instability Mechanism in Solidification” Proceedings of CSME Microgravity Science Symposium, (Held in Toronto, TO., 1990)
94. J.J. Xu, “Interfacial Travelling Waves in Solidification of a Binary System”, in the book, “Ocean Waves Mechanics, Computational Fluid Dynamics and Mathematical Modeling” —Proceedings of the 11-th International Annual Conference and Applied Mathematics Society held May 29 – June 1, 1990, at Halifax Hilton, Technical University of Nova Scotia, Halifax, Nova Scotia, Canada, edited by M. Rahman, published by Computational Mechanics Publications Southampton, Boston, pp. 829–836, (1990).
95. J.J. Xu, “Two-dimensional Dendritic Growth with Anisotropy of Surface Tension”, Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 90-27, (33 pages) (1990).
96. J.J. Xu, “Global Instability and Pattern Formation in Dendritic Solidification of a Dilute Binary Alloy System”, Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 90-05, (39 pages) (1990).
97. J.J. Xu, “Global Instability of Viscous Fingering in Hele–Shaw Cell: Formation of Oscillatory Fingers”, Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 90-28, (43 pages) (1990).
98. J.J. Xu, “On Regular-Tip Solutions of Dendritic Growth”, in the book, ‘Lie Theory, Differential Equations and Representation Theory’, edited by V. Hussin. (Proceeding of 1989 CMS Summer Seminar held in Montreal, QC., August 1989)

99. J.J. Xu, “On Singular Perturbation Solutions of Steady Axi-symmetric Needle-like Crystal Growth” , Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 89-15, (13 pages), (1989).
100. J.J. Xu, “Interfacial Wave Theory of Solidification — Dendritic Pattern Formation and Selection of Growth Velocity” , Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 89-36, (41 pages), (1989).
101. J.J. Xu, “Global Mode Theory for Dendritic Structure of a Growing Needle Crystal” , Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 89-14, (23 pages), (1989).
102. J.J. Xu, “Asymptotic Theory of Steady Axi-symmetrical Needle-like Crystal Growth” , Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 89-13, (32 pages), (1989).
103. J.J. Xu, “Interfacial Theory for Dendritic Pattern Formation in Solidification” , Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 89-20, (28 pages), (1989).
104. J.J. Xu, “Global Trapped Wave Modes of Dendritic Growth and Selection Condition of Growth Velocity” , Report from Department of Mathematics and Statistics, McGill University, ISSN 0824-4944, 89-23, (15 pages), (1989).

(E) Non-refereed Contributions

105. J.J. Xu and P. Scott, “A Numerical Simulation Study of Marangoni Convection in the Float Zone Configuration Including Unsteady Periodic 3-D Motion” (Project Mid-term and Final Report Submitted to Canadian Space Agency, in March, 1994).
106. J.J. Xu and Z.X. Pan, “Phase (IV) Study of Dendrite Growth in Micro-gravity” , (Project Final Report Submitted to Canadian Space Agency, in March, 1993).
107. J.J. Xu and Z.X. Pan, “Phase (III) Study of Dendrite Growth in Micro-gravity” (Project Final Report Submitted to Canadian Space Agency, in March, 1992).
108. J.J. Xu and Z.X. Pan, “Phase (II) Study of Dendrite Growth in Micro-gravity” (Project Final Report Submitted to Canadian Space Agency, in March, 1991).
109. J.J. Xu and Y. Hu, “Phase (I) Study of Dendrite Growth in Micro-gravity” (Project Final Report Submitted to Canadian Space Agency, in March, 1990).
110. J.J. Xu, “Interfacial Wave Theory of Pattern Formation in Dendrite Growth and Hele-Shaw Flow” , Lecture Notes Book for course, **Topics in Applied Mathematics** (189-761) for Graduate Students, Post-Doctorates and Research Associates at McGill University (1994).
111. J.J. Xu, “Numerical Solutions of Differential Equations” , Lecture Notes Book for course 189-579 for Graduate Students at McGill University (1994).
112. J.J. Xu, “Computational Matrices” , Lecture Notes Book for course math-327 at McGill University (1994).
113. J.J. Xu, “Elementary Numerical Analysis” , Lecture Notes Book for course math-317 at McGill University (1994).
114. J.J. Xu, “Applied Partial Differential Equations (A)” , Lecture Notes Book for course math-319 at McGill University (2005).
115. J.J. Xu, “Applied Partial Differential Equations (B)” , Lecture Notes Book for graduate course math-585 at McGill University (2003).