

Curriculum Vitae

I-Shih Liu

A. Institution

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B. Personal

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Rio de Janeiro, RJ 21940-005, Brasil
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C. Education

- **Graduate**

The Johns Hopkins University, Baltimore, Maryland, USA
Dates attended: 08/1967–02/1972
Degree: Ph. D. (Mechanics)

- **Undergraduate**

National Taiwan University, Taipei, Taiwan
Dates attended: 08/1960–06/1964
Degree: B. Sci. (Civil Engineering)

D. Professional Experiences

- Present Position: Emeritus Professor
Institute of Mathematics, Federal University of Rio de Janeiro
Brazil
- 1/2012–3/2012: Visiting Professor
Graduate Institute of Applied Geology, College of Earth Sciences
National Central University, Zhongli, Taiwan
- 1/2006–7/2006: Visiting Professor
Department of Mechanical Engineering
Texas A&M University, College Station, Texas, USA
- 2/2004: Visiting Professor
Nagoya Institute of Technology, Nagoya, Japan

- 7/2002–10/2002: Director Pro-Tempore
Instituto de Matemática, Universidade Federal do Rio de Janeiro
- 8/2000–10/2000: Alexander von Humboldt Research Fellow
Institut für Verfahrenstechnik, Technische Universität Berlin, Germany
- 9/1999: Visiting Fellow
Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany
- 2/1990–1/1991: Visiting Professor
Hermann Föttinger Institut, Technische Universität Berlin, Germany
- 2/1987–7/1988: Visiting Professor
Institute of Applied Mechanics, National Taiwan University
- 3/1986: Visiting Professor
Istituto di Matematica Applicata, Università di Bologna, Italy
- 8/1985–2/1986: Alexander von Humboldt Research Fellow
Hermann Föttinger Institut, Technische Universität Berlin, Germany
- 10/1982: Visiting Professor
Istituto di Matematica Applicata, Università di Bologna, Italy
- 11/1981–12/1982: Alexander von Humboldt Research Fellow
Hermann Föttinger Institut, Technische Universität Berlin, Germany
- 12/1976–2/1977: Visiting Research Fellow
Mathematics Department, Carnegie Mellon University
Pittsburgh, USA
- 4/1974–7/1974: Visiting Professor
Graduate Program in Engineering
Universidade Federal de Santa Maria, RS, Brasil
- 8/1972–9/2012: Professor
Institute of Mathematics, Federal University of Rio de Janeiro
Brazil
- 2/1972–8/1972: Post-doctoral Fellow
Mechanics Department, the Johns Hopkins University, USA
- 8/1967–2/1972: Teaching and Research Assistant
Mechanics Department, the Johns Hopkins University, USA
- 8/1965–7/1967: Teaching Assistant
Civil Engineering Department, National Taiwan University
Taipei, Taiwan

E. Publications

- **Thesis**

1. On irreversible thermodynamics
Ph.D. Dissertation
Thesis Advisor: Ingo Müller
The Johns Hopkins University, Baltimore, U.S.A (1972)

• **Books**

1. Continuum Mechanics
297 pp, ISBN: 3-540-43019-9
Series: Advanced Texts in Physics
Springer-Verlag, Berlin-Heidelberg-New York (2002)
2. Introdução ao Métodos de Elementos Finitos, Análise e Aplicação
(with M. A. Rincon)
ISBN: 85-87674-05-6 (in Portuguese)
213 pp, (2001), 3^a Ed., 378 pp, (2011)
IM-UFRJ, Rio de Janeiro
3. A Continuum Mechanics Primer, on constitutive theories of materials
Lecture note available online
<http://www.dmm.im.ufrj.br/liu/Papers/MCURS.pdf>
4. Constitutive Theories: Basic Principles in Continuum Mechanics,
Editores: Jose Merodio e Giuseppe Saccomandi
in Encyclopedia of Life Support Systems (EOLSS)
Developed under the auspices of the UNESCO Publications, Oxford, UK (2009)
[<http://www.eolss.net/E6-161-toc.aspx/>]
5. Continuous Media with Microstructure,
- On pore fluid pressure and effective solid stress in the mixture of porous media
Editor: B. Albers, Springer-Verlag, (2010).

• **Journal Articles**

1. Method of Lagrange multipliers for exploitation of entropy principle,
Arch. Rational Mech. Anal. 46, 131-148 (1972)
Doi: 10.1007/BF00250688
2. On thermodynamics and thermostatics of fluids in electromagnetic fields,
(with I. Müller)
Arch. Rational Mech. Anal. 46, 149-176 (1972)
Doi: 10.1007/BF00250689
3. A non-simple heat-conducting fluid,
Arch. Rational Mech. Anal. 50, 26-33 (1973)
Doi: 10.1007/BF00251292
4. On the entropy supply in a classical and a relativistic fluid,
Arch. Rational Mech. Anal. 50, 111-117 (1973)
Doi: 10.1007/BF00249878
5. Wave propagation in fluids in electromagnetic fields,
Arch. Rational Mech. Anal. 53, 347-358 (1974)
6. On the requirement that material symmetries shall preserve density,
Arch. Rational Mech. Anal. 68, 19-26 (1978)
Doi: 10.1007/BF00276176
7. On chemical potential and incompressible porous media,
Journal de Mecanique 19, 327-342 (1980)
8. On fluid pressure and buoyancy force in porous media,
Revista Brasileira de Tecnologia 11, 35-43 (1980)

9. Sobre a força resistiva em meios porosos anisotrópicos,
(with R. Sampaio Filho)
Revista Brasileira de Ciências Mecânicas 2, 21-24 (1980)
10. Termodinâmica de misturas fluido-sólido,
(with G. M. Kremer)
Revista Brasileira de Física 10, 275-292 (1980)
11. A note on material symmetry,
(with C. C. Wang)
Arch. Rational Mech. Anal. 74, 277-296 (1980)
Doi: 10.1007/BF00280543
12. Os tensores de condutividade térmica e resistividade em misturas
transversalmente isotrópicas,
(with G. M. Kremer)
Revista Brasileira de Física, 10, 921-936 (1980)
13. Propagação de ondas de aceleração em misturas
transversalmente isotrópicas,
(with G. M. Kremer)
Revista Brasileira de Física 11, 543-558 (1981)
14. A note on transversely isotropic functions,
Anais de Academia Brasileira de Ciência 54, 5-8 (1982)
15. On representations of anisotropic invariants.
Int. J. Engng Sci. 20, 1099-1109 (1982)
Doi: 10.1016/0020-7225(82)90092-1
16. Decay of electromagnetic waves in fluids,
(with G. M. Kremer)
J. Non-Equilib. Thermodyn. 8, 67-74 (1983)
17. Extended thermodynamics of classical and degenerate ideal gases,
(with I. Müller)
Arch. Rational Mech. Anal. 83, 285-332 (1983)
Doi: 10.1007/BF00963838
18. Extended thermodynamics of fluids and virial equations of state,
Arch. Rational Mech. Anal. 88, 1-23 (1985)
Doi: 10.1007/BF00250680
19. On structure of balance equations and extended field theories
of mechanics,
Il Nuovo Cimento 92B, 121-141 (1986)
Doi: 10.1007/BF02732642
20. Relativistic thermodynamics of gases,
(with I. Müller, T. Ruggeri)
Annals of Physics, 169, 191-219 (1986)
Doi: 10.1016/0003-4916(86)90164-8
21. An extended field theory of viscoelastic materials,
Int. J. Engng Sci. 26, 331-342 (1988)
Doi: 10.1016/0020-7225(88)90113-9
22. Extended thermodynamics of viscoelastic materials,
Continuum Mech. Thermodyn. 1, 143-164 (1989)
Doi: 10.1007/BF01141999

23. Hyperbolic system for viscous fluids and simulation of shock tube flows,
(with J. A. Salvador)
Continuum Mech. Thermodyn. 2, 179-197 (1990)
Doi: 10.1007/BF01129596
24. On Fourier's law of heat conduction,
Continuum Mech. Thermodyn. 2, 301-305 (1990)
Doi: 10.1007/BF01129123
25. Hyperbolic system of field equations for viscous fluids,
(with G. M. Kremer)
Mat. Aplic. Comp. 9, 123-135 (1990)
26. Energy control of numerical solutions of an elastic oscillator,
(with I. Suliciu)
Mathematics and Computers in Simulation 33, 209-221 (1991)
Doi: 10.1016/0378-4754(91)90120-R
27. On interface equilibrium and inclusion problems,
Continuum Mech. Thermodyn. 4, 177-186 (1992)
Doi: 10.1007/BF01130289
28. Stability of thick spherical shells,
Continuum Mech. Thermodyn. 7, 249-258 (1995)
Doi: 10.1007/BF01178591
29. Oscillation waves in Riemann Problems inside elliptic regions
for conservation laws of mixed type,
(with H. Frid)
Z. angew. Math. Phys. (ZAMP) 46, 913-931 (1995)
Doi: 10.1007/BF00917877
30. Phase mixtures in Dynamics of Pseudoelasticity,
(with H. Frid)
Continuum Mech. Thermodyn. 7, 475-487 (1995)
Doi: 10.1007/BF01175668
31. Vanishing relaxation limit of viscoelasticity,
(with Y. Wu)
Mathematics and Mechanics of Solids, 1, 227-241 (1996)
Doi: 10.1177/108128659600100206
32. Entropy flux - heat flux relation in thermodynamics with Lagrange multipliers,
Continuum Mech. Thermodyn. 8, 247-256 (1996)
Doi: 10.1007/s001610050042
33. Phase transitions and oscillation waves in an elastic bar
(with H. Frid)
Matemática Contemporânea, 10, 123-135 (1996)
34. Oscillation waves in Riemann Problems for phase transitions,
(with H. Frid)
Quarterly Appl. Math. 56, 115-135 (1998)
35. Instability of a square sheet under symmetric biaxial loading,
(with W. A. de Neves)
J. of Braz. Soc. Mechanical Sciences, 22, 545-549 (2000)
Doi: 10.1590/S0100-73862000000400004

36. Constitutive equations of extended thermodynamics from a hybrid pair of generator functions,
Continuum Mech. Thermodyn. 13, 25-39 (2001)
DOI:10.1007/s001610100040.
37. Iterative approximation of stationary heat conduction in extended thermodynamics,
(with M. A. Rincon, I. Müller)
Continuum Mech. Thermodyn. 14, 483-493 (2002)
DOI:10.1007/s001610200090.
38. Effect of moving boundaries on the vibrating string,
(with M. A. Rincon)
Applied Numerical Mathematics, 47, 159-172 (2003)
39. On numerical approximation of an optimal control problem in linear elasticity,
(with M. A. Rincon)
Divulgaciones Matemáticas, 11, 91-107 (2003)
<http://www.emis.de/journals/DM/vXI2/art1.pdf>
40. On the transformation property of the deformation gradient under a change of frame,
J. Elasticity, 71, 73-80 (2003)
Doi: 10.1023/B:ELAS.0000005548.36767.e7
41. A boundary value problem in extended thermodynamics – one-dimensional steady flows with heat conduction,
(with M. A. Rincon)
Continuum Mech. Thermodyn. 16, 109-124 (2004)
doi:10.1007/s00161-003-0144-2.
42. On Euclidean objectivity and the principle of material frame-indifference,
Continuum Mech. Thermodyn. 16, 177-183 (2004)
doi:10.1007/s00161-003-0149-x.
43. Existence and uniqueness of solutions of elastic string with moving ends,
(with M. A. Rincon)
Math. meth. Appl. Sci. 27, 1641-1655 (2004)
doi:10.1002/mma.517.
44. O princípio de Saint-Venant em elasticidade não linear,
(with J.D. da Silva, J.A. Ferreira)
Tend. Mat. Apl. Comput. 5, No. 2 (2004) 335-343.
45. Further remarks on Euclidean objectivity and the principle of material frame-indifference,
Continuum Mech. Thermodyn. 17, 125-133 (2005)
doi: 10.1007/s00161-004-0191-3.
46. Existence and uniqueness of solutions of a nonlinear heat equation,
(with M.A. Rincon, J. B. Límaco)
Tend. Mat. Apl. Comput. 5, No. 2 (2005), 273-284.
47. On well-posedness of classical boundary conditions in extended thermodynamics,
Proceedings of International Symposium on Trends in Applications of Mathematics to Mechanics (STAMM-2004), 225-233
Ed. by Y. Wang and K. Hutter, Shaker Verlag (2005).

48. Error estimates of vibrations of elastic string with moving ends,
(with M. A. Rincon)
Applied Numerical Mathematics, 56, 745-755 (2006).
49. Shock structure in viscoelasticity of relaxation type,
(with Y. Wu),
Nonlinear Analysis: Theory Methods & Applications, 65, 785-794 (2006)
doi:10.1016/j.na.2005.10.001.
50. Weighted iterative solutions of linear differential equations and
heat conduction of ideal gases in moment theory,
(with D. R. Vieira)
Z. angew. Math. Phys. (ZAMP), 57, 1075-1091 (2006)
doi:10.1007/s00033-005-0048-z.
51. A nonlinear heat equation with temperature-dependent parameters,
(with M. A. Rincon, J. Limaco)
Mathematical Physics Electronic Journal (MPEJ) 12, Paper 5 (2006).
(<http://www.ma.utexas.edu/mpej/Vol/12/5.pdf>).
52. A method of differential iteration for boundary value problem
in extended thermodynamics,
Nonlinear Analysis: Real World Applications, 8, 1113-1131 (2007).
doi:10.1016/j.nonrwa.2006.06.003.
53. Entropy flux relation in viscoelastic bodies
J. Elasticity, 90, 259-270, (2008).
doi:10.1007/s10659-007-9142-0.
54. Numerical analysis of quenching - heat conduction in metallic materials
(with M. G. Teixeira, M. A. Rincon)
Appl. Math. Modelling, 33, 2464-2473 (2009).
doi:10.1016/j.apm.2008.07.015.
55. On entropy flux of transversely isotropic elastic bodies
J. Elasticity, 96, 97-104 (2009).
doi:10.1007/s10659-009-9200-x.
56. Constitutive theory of anisotropic rigid heat conductors
Journal of Mathematical Physics, 50, 083506 (2009).
doi:10.1063/1.3190487.
57. Successive linear approximation for finite elasticity
(with R.A. Cipolatti; M.A. Rincon)
Computational and applied Mathematics, 29, 465-478 (2010)
doi:10.1590/S1807-03022010000300008.
58. Successive linear approximation for boundary value problems
of nonlinear elasticity in relative-descriptive formulation
International Journal of Engineering Science, 49, 635-645 (2011)
doi:10.1016/j.ijengsci.2011.02.006
59. Termodinâmica Estendida para Materiais Viscoelásticos com Condução de Calor
(with A. Vignatti)
TEMA Tend. Mat. Apl. Comput., 13, No. 1, 25-36 (2012).
doi: 10.5540/tema.2012.013.01.0025
60. A note on the Mooney-Rivlin material model
Continuum Mechanics and Thermodynamics, 24, 583-590 (2012)
doi: 10.1007/s00161-011-0197-6

61. Mathematical analysis of successive linear approximation for Mooney-Rivlin material model in finite elasticity
(with R.A. Cipolatti, M.A. Rincon)
Journal of Applied Analysis and Computation 2 (4), 363-379 (2012)
62. On Objectivity and the Principle of Material Frame-Indifference
(with Sampaio, R.)
Mecánica Computacional, Volume XXXI, 1553-1569 (2012)
63. Successive linear approximation for large deformation - Instability of salt migration
(with R.A. Cipolatti, M.A. Rincon, L.A. Palermo)
Journal of Elasticity, 114, 19-39 (2014)
doi: 10.1007/s10659-012-9424-z.
64. Remarks on material frame-indifference controversy
(with Sampaio, R.)
Acta Mechanica, 225, 331-348 (2014)
doi: 10.1007/s00707-013-0973-4.
65. A solid-fluid mixture theory of porous media
International Journal of Engineering Sciences, 84, 133-146 (2014)
doi: 10.1016/j.ijengsci.2014.07.002
66. The Influence of temperature on the formation of salt domes
(with M.G. Teixeira, M.A. Rincon, R.A. Cipolatti, L.A.C. Palermo)
Int. J. of Modeling and Simulation for the Petroleum Industry, 8, 35-41 (2014)

F. Conference Papers

1. V Encontro Sobre Escoamento em Meios Porosos
Rio de Janeiro - RJ, 12-14/10 (1977)
- Sobre a anisotropia dos meios porosos
(with R. Sampaio Filho)
Anais do ENEMP 5, I.3/1-15
2. VI Encontro Sobre Escoamento em Meios Porosos
Rio Claro - SP, 11-13/10 (1978)
- Sobre potencial químico e pressão do fluido em meios porosos
(with J. A. Salvador)
Anais do ENEMP 6, II/1-23
3. VII Encontro Sobre Escoamento em Meios Porosos
Aracajú - Sergipe, 11-13/10 (1979)
- On pressure and buoyancy force in porous media
Anais do ENEMP 7, 221-238
4. VII Encontro Sobre Escoamento em Meios Porosos
Aracajú - Sergipe, 11-13/10 (1979)
- Termodinâmica de misturas fluido-sólido
(with G. M. Kremer)
Anais do ENEMP 7, 269-290
5. VIII Encontro Sobre Escoamento em Meios Porosos
Curitiba - Paraná, 20-22/10 (1980)
- Propagação de ondas de aceleração em misturas transversalmente isotrópicas
(with G. M. Kremer)
Anais do ENEMP 8, 237-255

6. VIII Encontro Sobre Escoamento em Meios Porosos
Curitiba - Paraná, 20-22/10 (1980)
- A note on transversely isotropic functions
Anais do ENEMP 8, 256-269
7. VIII Encontro Sobre Escoamento em Meios Porosos
Curitiba - Paraná, 20-22/10 (1980)
- Os tensores de condutividade térmica e resistividade em misturas
transversalmente isotrópicas
(with G. M. Kremer)
Anais do ENEMP 8, 414-436
8. Gesellschaft für Angewandte Mathematik und Mechanik – Jahrestagung 1982 (GAMM-Conference)
Budapest, Hungria, 13-16/04 (1982)
- Decay of electromagnetic waves in fluids
(with G. M. Kremer)
Abstract p.195
9. XXI Seminário Brasileiro de Análise
Brasilia - DF, 14-17/05 (1985)
- Symmetric hyperbolic systems and balance equations of thermodynamics
SBA 21, 171-180
10. The Sixth Symposium on
Trends in Applications of Pure Mathematics to Mechanics
Bad Honnef, Germany, 21-25/10 (1985)
- Virial coefficients from extended thermodynamics
Lecture Notes in Physics, Vol. 249, 51-55, Springer 1985
11. XII Congresso Nacional de Matemática Aplicada e Computacional
Sao Jose do Rio Preto - SP, 04-08/09 (1989)
- Simulação numérica de onda de choque com efeito de viscosidade
(with J. A. Salvador)
Resumo CNMAC 12, 226-229
12. Fifth Bilateral Polish-Italian Meeting on Thermodynamics and kinetic Theory
Madralin, Warsaw, Poland, 28-31/08 (1990)
- Extended thermodynamics of viscoelasticity
Thermodynamics and Kinetic Theory,
Proceedings Ed. by: W. Kosinski, W. Larecki, A. Morro & H. Zorski
Series on Advances in Math. for Appl. Sci. vol 12. 93-106
World Scientific Publishing, Singapore 1992
13. Euromech Colloquium 270 on Nonlinear Waves
Governed by Hyperbolic Dissipative Models
Reggio Calabria, Italy, 25-28/09 (1990)
- Viscoelasticity in extended thermodynamics
Nonlinear Waves and Dissipative Effects, Ed. by: D. Fusco & A. Jeffrey
Pitman Research Notes in Mathematics 227, 218-230
Longman Scientific & Technical, Essex 1991
14. XIII Congresso Nacional de Matemática Aplicada e Computacional
Aguas de Lindóia - SP, 26-29/11 (1990)
- Simulação numérica de ondas de choque via termodinâmica estendida
de um fluido viscoso com condução de calor
(with J. A. Salvador)

15. XIV Congresso Nacional de Matemática Aplicada e Computacional
Nova Friburgo - RJ, 02-05/09 (1991)
- Controle energético de soluções numéricas de um oscilador elástico
Resumo CNMAC 14, p. 75
16. Twenty-second Midwestern Mechanics Conference
University of Missouri-Rolla, USA, 06-09/10 (1991)
- On thermodynamics of viscoelasticity
17. Mathematisches Forschungsinstitut Oberwolfach
Meeting on *Thermodynamic Constitutive Theories*
Oberwolfach, Germany, 03-07/02 (1992)
- Interface equilibrium and inclusion problems
18. Seminário de Supercomputação Aplicada
Centro Nacional de supercomputação (CESUP/UFRGS),
Porto Alegre, RS, 12-14/09 (1994)
- Numerical experiments of Riemann problems
for conservation laws of mixed type
(with H. Frid)
Anais SuperComp 94, 261-264
19. Third SIAM Conference
on Mathematical and Computational Issues in the Geosciences
San Antonio, Texas, USA, 8-10/02 (1995)
- Oscillation waves in Riemann problems for systems of mixed type
(with H. Frid)
20. IV Workshop on Partial Differential Equations
IMPA, Rio de Janeiro, RJ, 17-21/07 (1995)
- Phase transitions and oscillation waves in an elastic bar
(with H. Frid)
Matemática Contemporânea, 10, 123-135 (1996)
21. XVIII Congresso Nacional de Matemática Aplicada e Computacional
Curitiba, PR, 28/08-01/09 (1995)
- Phase transition in elasticity and viscoelasticity
Resumos CNMAC 95, 440-444
22. IV Encontro Regional de Matemática Aplicada e Computacional
IPRJ/UERJ, Nova Friburgo, RJ, 10-12/04 (1996)
- Some problems in finite elasticity
Conferência
23. XLIII Seminário Brasileiro de Análise
São Paulo, SP, 23-25/05 (1996)
- The viscoelastic equations with relaxation
(with Y. Wu)
SBA 43, 311-322
24. 1996 ASME Mechanics & Materials Conference
Symposium on Elasticity in Honor of Professor J. L. Ericksen
The Johns Hopkins University, Baltimore, Md. U.S.A. 12-15/06 (1996)
- Numerical solutions for phase transitions in elasticity
Contemporary research in the mechanics and mathematics of materials,
Ed. by: R. C. Batra and M. F. Beatty
International Center for Numerical Methods in Engineering (CIMNE), Barcelona, Spain (1996),
287-297.

25. XIX Congresso Nacional de Matemática Aplicada e Computacional
Goiânia, GO, 16-20/09 (1996)
- Estudo de estabilidade de extensão biaxial numa placa quadrada
(with W. A. das Neves)
Resumos CNMAC 96, 474-475
26. Mathematisches Forschungsinstitut Oberwolfach
Meeting on *Thermodynamic Constitutive Theories*
Oberwolfach, Germany, 23-27/09 (1996)
- Numerical solutions for dynamic formation of phase mixtures
27. 44° Seminário Brasileiro de Análise
Ribeirão Preto - SP, 21-23/11 (1996)
- Constitutive theories of mechanics
SBA 44, 35-118, Minicurso
28. XXI Congresso Nacional de Matemática Aplicada e Computacional
Caxambu, MG, 14-18/09 (1998)
- Solução analítica e numérica para o controle ótimo da equação de Poisson
(with Mauro A. Rincon)
Resumo das Comunicações CNMAC 98, 6
29. XXI Congresso Nacional de Matemática Aplicada e Computacional
Caxambu, MG, 14-18/09 (1998)
- Transformation of deformation gradient under change of frame
Resumo das Comunicações CNMAC 98, 236
30. XXI Congresso Nacional de Matemática Aplicada e Computacional
Caxambu, MG, 14-18/09 (1998)
- Shock structure in vanishing relaxation limit
(with Yumei Wu)
Resumo das Comunicações CNMAC 98, 239
31. 48° Seminário Brasileiro de Análise
LNCC, Petrópolis - RJ, 25-28/11 (1998)
- Introdução ao método dos elementos finitos e controle ótimo
(with Mauro A. Rincon)
SBA 48, 261-347, Minicurso
32. 48° Seminário Brasileiro de Análise
LNCC, Petrópolis - RJ, 25-28/11 (1998)
- Elastic shock solutions in vanishing relaxation limit
(with Yumei Wu)
SBA 48, 985-993
33. XXII Congresso Nacional de Matemática Aplicada e Computacional
Santos, SP, 13-17/09 (1999)
- Solução numérica do problema da corda elástica com fronteira livre
(with Mauro A. Rincon)
Resumo das Comunicações, CNMAC 99, 262
34. 50° Seminário Brasileiro de Análise
São Paulo, SP 24-27/11 (1999)
- Estudo numérico de vibração da corda elástica com fronteira móvel
(with Mauro A. Rincon)
SBA 50, 609-624

35. 3^a Jornada de Matemática Aplicada e Computacional
Petrópolis, RJ, 24/04 (2000)
- Análise e simulação numérica da vibração da corda elástica com fronteira móvel
(with Mauro A. Rincon)
Anais, vol. 3, 1-13
36. 2000 SIAM Annual Meeting
Rio Grande, Porto Rico, 10-14/07 (2000)
- Nonlinear model of vibrating elastic string with moving ends
(with Mauro A. Rincon)
Abstract, vol. 1, 70
37. Analysis and Numerics of Conservation Laws (ANumE),
Workshop on Boltzmann and Transport Equations
Blaubeuren, Germany, 28/08-01/09 (2000)
- Mixed representations for extended thermodynamics
Local organization: Universität Tübingen, Germany
Program, p. 19
38. XXIII Congresso Nacional de Matemática Aplicada e Computacional
Santos, SP, 11-15/09 (2000)
- Modelo linear de vibração da corda elástica com fronteira móvel
(with Mauro A. Rincon)
CNMAC 23, 8
39. International Conference in Potsdam –
on Continuum Mechanics & Thermodynamics
Potsdam, Germany, 30/07-03/08 (2001)
- Iterative approximation of boundary value problems
in extended thermodynamics
Program, p. 2
40. International Workshop on Numerical Linear Algebra,
Numerical Methods for Partial Differential Equations
and Optimization
Curitiba, PR, 20-23/08 (2001)
- Effect of a Moving Boundary on the Vibrating Elastic String
(with Mauro A. Rincon)
Atas do congresso, p. 51
41. XXIV Congresso Nacional de Matemática Aplicada e Computacional
Belo Horizonte, MG, 10-13/09 (2001)
- Estimativa de erro em elementos finitos do modelo da corda elástica
com fronteira móvel
(with Mauro A. Rincon)
Resumo das Comunicações, p. 392
42. 14th U.S. National Congress of Theoretical and Applied Mechanics
Blacksburg, Virginia USA, 23-28/06 (2002)
- On the determination of unconventional boundary conditions
for system of moment equations
Proceedings of Contemporary Research in Theoretical and Applied Mechanics
(ISBN 0-9721257-0-1), p. 293

43. XXVI Congresso Nacional de Matemática Aplicada e Computacional
São José do Rio Preto, SP, 08-11/09 (2003)
- On boundary value problems in extended thermodynamics
A case study of uncontrollable boundary data
(with Mauro A. Rincon)
Resumo das Comunicações, p. 418
44. XXVI Congresso Nacional de Matemática Aplicada e Computacional
São José do Rio Preto, SP, 08-11/09 (2003)
- O princípio de Saint-Venant em elasticidade não linear
(with Jocitiel D. da Silva)
Resumo das Comunicações, p. 606
45. 61º Seminário Brasileiro de Análise
São João del Rey, MG, 18-20/05 (2005)
- Método iterativo para problemas de ponto fixo de operadores diferenciais
(with Daniel R. Vieira)
SBA 61, 163-170
46. The Fifth Annual Hawaii International Conference
on Statistics, Mathematics and Related Field
Honolulu, Hawaii, USA, 16-18/01 (2006)
- An iterative method for fixed-point problems of differential operators
Proceedings: 1152-1160
47. Congresso de Matemática d suas Aplicações (FOZ2006)
Foz do Iguacu, PR 07-11/08 (2006)
- Incremental linear approximation of large deformations in finite elasticity
(with Rolci A. Cipolatti, Mauro A. Rincon)
48. Internal Conference on Numerical Analysis and Applied Mathematics
Hersonissos, Crete, Greece, 15-19/09 (2006)
- Incremental linear approximation for finite elasticity
(with Rolci A. Cipolatti, Mauro A. Rincon)
Proceedings of ICNAAM 2006: 199-202,
Eds. T. E. Simos, G. Psihoyios and Ch. Tsitouras,
ISBN: 3-527-40743-X, Wiley-VCH Verlag, Weinheim (2006)
49. XIV International Conference on Waves and Stability in Continuum Mechanics
Scicli, Ragusa, Italy, 30/06-07/07 (2007)
- Numerical simulation of large deformations in solid bodies, instability of density inversion in
layered structure
50. International Workshop on New directions in Continuum Mechanics:
on the interplay among mathematics, mechanics and physics
Castro Urdiales, Cantabria, Spain, 08-11/09 (2008)
- Successive linear approximation for finite elasticity - Bending of a rectangular block
51. Meeting of collaborators in the Continuum Mechanics book for UNESCO-EOLSS encyclopedia
(<http://www.eolss.net/E6-161-toc.aspx>)
Editores: Jose Merodio e Giuseppe Saccomandi
Castro Urdiales, Cantabria, Spain, 11-12/09 (2008)
- Chapter 6: Constitutive Theories: Basic Principles
52. 2009 SIAM Conference on Mathematical & Computational Issues
in the Geosciences
Leipzig, Germany, 15-18/06 (2009)
- Large deformation in viscoelastic solid bodies - Numerical simulations of salt migration

53. Um Passeio pela Termodinâmica Fenomenológica e Estatística,
17/10/2009, Curitiba, Setor de Ciências Exatas, Universidade Federal do Paraná.
- Objetividade Euclideana e o Princípio da Indiferença do Material ao Referencial
Conference
54. Mathematical Methods in Engineering International Symposium
Coimbra, Portugal, 21-24/10 (2010)
- Numerical approximation for finite deformation - bending of a rectangular block
55. Workshop of Geomechanics and Numerical Methods for Reservoir Simulation.
LNCC, Petrópolis, Rio de Janeiro, 20-22/06 (2011)
- Mathematical modeling of salt diapirism
Conference
56. 11th U.S. National Congress of Computational Mechanics
Minneapolis, Minnesota, USA, 25-28/07 (2011)
- Successive linear approximation for large deformation
57. International Workshop on Numerical Methods and Modelling for Compressible Multimaterial
Flows and Mixing
Institute of Applied Physics and Computational Mathematics
Beijing, China, 12-15/09 (2011)
- Constitutive theories of material models
- Mathematical modeling of large deformation in salt tectonics
Conferences
58. XXXIV Congresso Nacional de Matemática Aplicada e Computacional
Águas de Lindóia, SP, 17-21/09 (2012)
- Mathematical modeling of large deformation in salt tectonics
Conferência.
59. X Congreso Argentino de Mecánica Computacional (MECOM 2012)
Salta, Argentina, 13-16/11 (2012)
- On objectivity and the principle of material frame-indifference
(with Rubens Sampaio)
Proceedings: Mecánica Computacional Vol XXXI, 1553-1569 (2012)
60. American Geophysical Unions 45th Annual Fall Meeting (Geomechanics 2012 AGU Fall Meeting)
San Francisco, CA, USA, 3-7/12 (2012)
- A geo-mechanics model for CO₂ sequestration simulations under multiphase flow-multispecies
transport systems
(with G.T. Yeh and C.H. Tsai)
61. 12th U.S. National Congress on Computational Mechanics (USNCCM12)
Raleigh, North Carolina, USA, 22-25/07 (2013)
62. Humboldt Kolleg 2013, Science & Technology in Contemporary Life "Impact and Horizons"
Campos do Jordão - SP, 28-30/09 (2013)
- Mathematical modeling and numerical simulation of salt tectonics in geomechanics.
63. XXXIV Ibero Latin American Congress on Computational Methods in Engineering
(CILAMCE2013). Pirenópolis, Goiás, 10-13/11 (2013)
- The influence of temperature on the formation of salt domes.
(with M.R. Teixeira, M.A. Rincon, R.A. Cipolatti)
64. 2013 Conference on Computational Mechanics (CCM2013)
Sanya, China, 29/11-01/12 (2013)
- Mathematical modeling and numerical simulation of salt migration in geomechanics.

65. 11th World Congress on Computational Mechanics (WCCM XI)
Barcelona, Spain, 2025/07 (2014)
(with M.G. Teixeira, M.A. Rincon, R.A. Cipolatti, L.A.C. Palermo)
- Thermo-mechanical coupling for salt tectonics
66. International Conference on Continuous Media with Microstructure (CMwM2015)
Lagów, Poland, 01-05/03 (2015)
- A mixture theory of porous media and some problems of poroelasticity

G. Courses Lectured

• Undergraduate level

- Linear algebra:
Basic concept in finite dimensional vector space, solution of linear system and eigenvalue problems, ...
- Tensor analysis:
Tensor algebra and tensor calculus in Euclidean space.
- Calculus II:
Linear ordinary different equations with constant coefficients, sequence, infinite series. ...
- Calculus III:
Surface and volume integrals, divergence and Stokes theorems. ...
- Calculus IV:
Ordinary and partial differential equations, Laplace transform, Fourier series, boundary value problems. ...
- Applied mathematics:
Ordinary and partial differential equations, Sturm-Liouville problem, orthogonal functions, ...

• Graduate level

- Continuum mechanics:
Kinematics, balance equations, constitutive theories of material bodies, representation theorems of isotropic functions
- Continuum thermodynamics:
General entropy inequality, entropy principle, method of Lagrange multipliers, thermodynamics of isotropic solid and viscous fluids with heat conduction
- Finite elasticity:
Some exact solutions in isotropic elastic bodies in static and dynamic problems, variational formulation and finite element solutions
- Special topics in continuum mechanics:
Mixture theories, porous media, wave propagation, extended thermodynamics, boundary value problems in moment systems, ...

H. Research Interests

- General and fundamental issues of continuum mechanics and thermodynamics
- Constitutive theories of materials bodies, general entropy principle and method of Lagrange multipliers
- Theories of mixtures and porous media
- Numerical problems in continuum mechanics
- Extended thermodynamics of gases, fluids and viscoelastic solids

- Boundary value problems of extended thermodynamics

I. Other Activities

- Member: Sociedade Brasileira de Matemática
- Member: Sociedade Brasileira de Matemática Aplicada e Computacional
- Member: International Society for the Interaction of Mechanics and Mathematics
- Member: American Mathematical Society
- Editorial board: Journal of Mathematical Sciences: Advances and Applications
(<http://scientificadvances.org/journals1.htm>)
- Editorial board: Journal of Mechanics of Multi-Component Materials