

CURRICULUM OF ATTILIO FRANGI (october 2017)

Born in Milano, Italy, September 6th, 1969

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Current position

Full Professor of Solid and Structural Mechanics (Scienza delle Costruzioni), Department of Civil and Environmental Engineering, Politecnico di Milano

Deputy Director, Department of Civil and Environmental Engineering, Politecnico di Milano

Curriculum Vitae et Studiorum

- 1988 Diploma of “Maturità Scientifica”, Institute Leone XIII, Milano (60/60)
- 1994 Degree in Aeronautical Engineering, Politecnico di Milano (cum laude).
- 1994-95 Research stage, Ecole Polytechnique, Palaiseau (Paris), supervisor Dr. Marc Bonnet
- 1997 Research stage (July-August), Department of Civil Engineering, University of Minnesota, Minneapolis.
- 1998 Ph.D. in Structural Engineering, Politecnico di Milano. Dissertation on “Some Developments in the Symmetric Galerkin Boundary Element Method”, supervisors Proffs. Giulio Maier and Giorgio Novati
- 2000-04 Assistant Professor, Department of Structural Engineering, Politecnico di Milano
- 2001-14 Professeur chargé de cours, Département de Mécanique, Ecole Polytechnique, Paris
- 2004-14 Associate Professor, Department of Structural Engineering, Politecnico di Milano
- 2012 “Qualification” aux fonctions de Professeur des Universités en France, Section 60, Mécanique
- 2014 “Qualification” to Full Professor Position, Italy (S.C. 08/B2 - Scienza delle Costruzioni)
- since 2015: Full Professor, ICAR08 (Solid and Structural Mechanics), Department of Civil and Environmental Engineering, Politecnico di Milano
- since 2017: Deputy Director, Department of Civil and Environmental Engineering, Politecnico di Milano

Distinctions and awards

- 1999 “Fondazione Confalonieri prize” for PhD students
- 2001 “Young Researcher Fellowship Award”, Massachusetts Institute of Technology (Prof. K.J. Bathe), Cambridge, June, 2001
- 2009 “Bruno Finzi” prize for Analytical Mechanics (Meccanica Razionale), Istituto Lombardo Accademia di Scienze e Lettere

Scientific responsibilities (scientific animation)

Responsibilities at the Politecnico di Milano

since 2010 Member of Scientific Council for the PhD school in Structural Engineering

Editorial board membership

- European Journal of Computational Mechanics (ex Revue Européenne de Mécanique Numérique) since 2009
- CMES (Computer Modelling in Engineering & Science) since 2009
- Journal of Applied and Computational Mechanics, since 2016

Academic committee membership

Scientific Advisory Board of IABEM (International Association for Boundary Element Methods) www.iabem.org

Organization of Conferences and Workshops

- Member of the local Organizing Committee, VIII World Congress on Computational Mechanics (WCCM8), Venice, Italy, June 30 - July 5, 2008
- Organizer of the IUTAM-IACM symposium “*Advances in multiphysics simulation and experimental testing of MEMS and NEMS*” WCCM8-Eccomas08, Venice, Italy, June 30 - July 5, 2008
- Organizer of the symposium “*Advances in Boundary Element Methods*” WCCM8-Eccomas08, Venice, Italy, June 30 - July 5, 2008
- Organizer of the symposium “*Fast Boundary Element Methods*”, 10th US National Congress on Computational Mechanics (USNCCM 10) Columbus, Ohio, July 16-19, 2009
- Organizer of the symposium “*Computational Methods For Micro And Nano Systems*”, Fourth European Conference on Computational Mechanics, May 16 -21, 2010. Paris, France.
- Organizer of the symposium “*Fast Multipole Methods, Fast Boundary Element Solvers, and Applications*”, Fourth European Conference on Computational Mechanics, May 16 -21, 2010. Paris, France.
- Organizer of the symposium “*Advances in Boundary Element Methods*”, WCCM/APCOM20010, Sidney, July 19-23, 2010
- Organizer of the symposium “*Fast Boundary Element Methods*”, Eccomas12, Vienna, Sept 10-14, 2012
- Organizer of the symposium “*Mechanics of Micro-Electro-Mechanical Systems*”, 9th European Solid Mechanics Conference, Madrid, Spain, July 6 - 10, 2015
- Organizer of the symposium “*Micro and Nano Electro-Mechanical Systems*”, 10th European Solid Mechanics Conference, Bologna, Italy, July 2 - 6 2018
- Member of the Scientific Committee, Symposium of the International Association for Boundary Element Methods (IABEM), Paris, June 26-28 2018

Grants and Private Funds for Research

AF has served as an investigator in the framework of many national, European and private research grants. Hereafter are listed only those activities that AF has been coordinating under personal scientific responsibility

Active grants

- STMicroelectronics: *Analysis and mechanical modelling of Micro-Electro-Mechanical-Systems (MEMS)*, scientific responsibility: A. Corigliano and A. Frangi, 2017-18; 320 kEuro
- STMicroelectronics: *Characterization, modelling and design of Thin Film Piezo*, scientific responsibility: A. Corigliano and A. Frangi, 2016-17; 50 kEuro
- ENIAC 2013-2: *Lab4MEMS II “Micro-Optical MEMS, micro-mirrors and pico-projectors*, 2014-18, local scientific responsibility: A. Frangi, local unit funding 295 kEuro

Past grants

- STMicroelectronics: *Analysis and mechanical modelling of Micro-Electro-Mechanical-Systems (MEMS)*, scientific responsibility: A. Corigliano and A. Frangi, 2015-16; 305 kEuro
- ABB Switzerland Ltd, Corporate research: *Lagrangian Formulation and Modelling of AMF Vacuum Arcs*, 2016, scientific responsibility: A. Frangi and M. Cremonesi; 34 kEuro
- ABB Switzerland Ltd, Corporate research: *Lagrangian Approaches for the Modelling of Vacuum Arcs in 3D*, 2015, scientific responsibility: A. Frangi and M. Cremonesi; 50 kEuro
- ABB Switzerland Ltd, Corporate research: *Lagrangian Approaches for the Modelling of Vacuum Arcs in 3D*, 2014, scientific responsibility: A. Frangi; 50 kEuro
- FP7-ICT-2009.3.9, Microsystems and Smart Miniaturised Systems: *Go4Time - Global, Flexible, On-demand and Resourceful Timing IC & MEMS Encapsulated System*, 2010–14, local scientific responsibility: A. Frangi; local unit funding 260 kEuro
- STMicroelectronics: *Analysis and mechanical modelling of Micro-Electro-Mechanical-Systems (MEMS)*, scientific responsibility: A. Corigliano and A. Frangi, 2013-14; 290 kEuro
- STMicroelectronics: *Analysis and mechanical modelling of Micro-Electro-Mechanical-Systems (MEMS)* scientific responsibility: A. Corigliano and A. Frangi, annual grants from 2007 to 2011; total funding 320 kEuro
- ABB S.p.A. (ABB0002 N 2012/62): *Analysis of bistable elements and application to differential switches*, scientific responsibility: A. Frangi, 2012-13; 34 kEuro
- Tetra Pak Carton Ambient (TETRA01.2009/11), *Development of numerical methods for the carton packaging process*, scientific responsibility: U. Perego and A. Frangi, 2009; 100 kEuro
- Rocca Foundation Grant: *Development of Numerical Simulation and Modelling Tools for MEMs and Emerging Technologies*. Collaboration between the Massachusetts Institute of Technology (MIT) “*Computational Prototyping Group*” (Profs. Luca Daniel and Jacob White) and the Politecnico di Milano “*Polimi-DIS*” group (Profs A. Frangi and A. Corigliano), 2008-09; 15 k\$
- Coventor, (COVENT01 2007/25): *Development of a boundary-element-based computer code for the solution of fluid damping in MEMS*, scientific responsibility: A. Frangi, 2007-09; 12 kEuro
- Tecnomare, (TECNOM1 2007/2): *Fatigue resistance of a forged tee*, 2007, scientific responsibility: A. Frangi; 6.5 kEuro

PATENTS

Microelectromechanical three-axis capacitive accelerometer

Patent number: 8863575

Abstract: A micromechanical structure for a MEMS structure is provided with: a substrate; a single inertial mass having a main extension in a plane and arranged suspended above the substrate; and a frame element, elastically coupled to the inertial mass by coupling elastic elements and to anchorages, which are fixed with respect to the substrate by anchorage elastic elements. The coupling elastic elements and the anchorage elastic elements are configured so as to enable a first inertial movement of the inertial mass in response to a first external acceleration acting in a direction lying in the plane and also a second inertial movement of the inertial mass in response to a second external acceleration acting in a direction transverse to the plane.

Type: Grant

Filed: June 15, 2011

Date of Patent: October 21, 2014

Assignee: STMicroelectronics S.R.L.

Inventors: Attilio Frangi, Biagio De Masi, Barbara Simoni

Shock Sensor With Bistable Mechanism And Method Of Shock Detection

Patent number: 9316550

Abstract: A shock sensor includes: a supporting body; a bistable mechanism, configured to switch from a first stable mechanical configuration to a second stable mechanical configuration in response to an impact force applied along a detection axis and such as to supply to the bistable mechanism an amount of energy higher than a transition energy; and a detection device, coupled to the bistable mechanism and having a first state, when the bistable mechanism is in an initial stable mechanical configuration and a second state, after the bistable mechanism has made a transition from the initial stable mechanical configuration to a final stable mechanical configuration. The bistable mechanism includes at least one elastic element, constrained to the supporting body in at least two opposite peripheral regions and defining a first concavity in the first stable mechanical configuration and a second concavity, opposite to the first concavity, in the second stable mechanical configuration.

Type: Grant

Filed: August 1, 2013

Date of Patent: April 19, 2016

Assignee: STMicroelectronics S.r.l.

Inventors: Attilio Frangi, Biagio De Masi, Leonardo Baldassarre

Cantilever Piezoelectric Transducer

Application number: US 20160373031 A1

Abstract: A piezoelectric transducer includes: an anchorage; a beam of semiconductor material, extending in cantilever fashion from the anchorage in a main direction parallel to a first axis and having a face parallel to a first plane defined by the first axis and by a second axis perpendicular to the first axis; and a piezoelectric layer on the face of the beam. A cross-section of the beam perpendicular to the first axis is asymmetrical and is shaped so that the beam presents deformations out of the first plane in response to forces applied to the anchorage and oriented according to the first axis.

Type: Application

Filed: December Dec 12, 2015

Publication date: Dec 22, 2016

Inventors: Attilio Frangi, Francesco Procopio

Also published as: CN205595377U, EP3107202A1

Teaching activities

A.Frangi has developed an extensive teaching activity both at the Politecnico di Milano, since 1998, and at the Ecole Polytechnique, from 2001 to 2014. He has had the responsibility for over 30 complete courses of solid/structural mechanics and of numerical methods in solid mechanics.

He is member of the Committee of the Doctoral School at the Department of Civil and Environmental Engineering, since 2010.

From 2013 to 2015 he has been member of the Council (Giunta) of the School of Building Engineering at the Politecnico di Milano

Complete courses at the Politecnico

2001-2016	“Statics” for Building Engineers
2007-2012	“Scienza delle Costruzioni” (Strength of Materials and Structures) for Civil Engineers
2013-2017	“Scienza delle Costruzioni” (Strength of Materials and Structures) for Building Engineers
2017-2018	“Scienza delle Costruzioni” (Strength of Materials and Structures) for Mathematical Engineers

Complete courses at the Ecole Polytechnique

2010-2014 “The Finite Element Method for Solid Mechanics” (MEC557)

taught in English. The teaching experience accumulated during this course, building also in the scientific passion for numerical methods, has led to the very recent publication of the book

- Bonnet M., Frangi A. and Rey C., The finite element method in solid mechanics, McGraw-Hill Education, ISBN 9788838674464, 2014

which takes an innovative approach to the teaching of the FEM. The book, evolution of a previous successful publication in French, is addressed to Master and PhD students, but also to researchers looking for a rigorous introduction to FEM theory and programming for linear and non-linear problems through annotated Matlab code and/or numerical examples produced with it.

PhD Courses

2015 and 2017, “Nonlinear finite element methods in solid mechanics”, Politecnico Milano PhD School

Supervision of theses

Attilio Frangi has been supervisor (or co-supervisor) of 20 Master theses (approximately 10 months projects at the end of two year Master courses) and 4 PhD theses:

- Arturo di Gioia, Fast Multipole Accelerated Boundary Element Technique for large scale problems with applications to MEMS (with G.Novati), 2005
- Massimiliano Cremonesi, A Lagrangian finite element method for the interaction between flexible structures and free surface flows (with U. Perego), 2010
- Patrick Fedeli, Phase field methods for piezo material simulation, 2015-18
- Andrea Guerrieri, Non linear dynamics in MEMS, 2015-18

List of books and journal papers

Quantitative parameters, as of October, 2017 (query: Frangi Attilio):

- Scopus data-base: H index = 22, number of citations 1298
- Google Scholar: H index = 28, number of citations 2006

Scientific book

- B1. Alberto Corigliano, Raffaele Ardito, Claudia Comi, Attilio Frangi, Aldo Ghisi, Stefano Mariani, *Mechanics of Microsystems*, ISBN: 978-1-119-05383-5, 464 pages, Wiley, January 2018

Scientific book (editor)

- B2. Frangi A., Aluru N., Cercignani C., Mukherjee S. eds., *Advances in Multiphysics Simulation and experimental testing of MEMS*, Imperial College Press, London, ISBN-10 1-86094-862-6, 2008

Books with teaching focus

- B3. Bonnet M., Frangi A., *Analyse des solides déformables par la méthode des éléments finis*, Les Editions de L'Ecole Polytechnique, ISBN : 2-7302-1349-X, 2006
- B4. Frangi A., *Statica e cinematica dei sistemi di corpi rigidi*, Progetto Leonardo - Esculapio, Bologna, 978-88-7488-621-0, 2008
- B5. Bonnet M., Frangi A. and Rey C., *The finite element method in solid mechanics*, McGraw-Hill Education, ISBN 978-88-386-7446-4, 2014

Chapters in books

- C1. Frangi A., Regularization of Boundary Element formulations by the derivative transfer method, *Singular Integrals in Boundary Element Methods* (in the series: *Advances in Boundary Elements*), Sladek V., Sladek J. eds., Computational Mechanics Publications, Southampton, chap. 4, 125-164, 1998
- C2. Novati G., Frangi, A., Symmetric Galerkin BEM in 3D elasticity: computational aspects and applications to fracture mechanics, in *Selected Topics in Boundary Integral formulations for Solids and Fluids*, (CISM Courses and Lectures no.433, International Centre for Mechanical Sciences), V. Kompis Editor, Springer-Verlag, pp.181-207, 2002
- C3. Frangi, A., Maier G., Novati G., Springhetti G., Symmetric Galerkin Boundary Element analysis in 3D linear elastic fracture-mechanics, in: W. S. Hall and G. Oliveto Eds., *Boundary Element Methods for Soil-Structure Interaction*, Kluwer Acad. Publ., Dordrecht, Chapter 8, 315-341, 2003, ISBN: 1-4020-1300-0
- C4. Frangi, A., Maier, G., The symmetric Galerkin BEM in linear and non-linear fracture mechanics of zonewise homogeneous solids, *Recent Advances in Boundary Element and their Solid Mechanics Applications*, D. Beskos ed., (CISM Courses and Lectures no.440, International Centre for Mechanical Sciences), Springer-Verlag, pp. 167-204, 2003
- C5. Frangi A., Ye W., White J., Evaluating gas damping in MEMS using fast integral equation solvers, in *Advances in Multiphysics Simulation of MEMS and NEMS* edited by Frangi A., Aluru N., Cercignani C., Mukherjee S., Imperial College Press, London, chap 5, pp. 153-182, 2008
- C6. Corigliano A., Cacchione F., Frangi A., Zerbini S. and Ferrera M., Mechanical characterization of polysilicon at the micro-scale through on-chip tests, in *Advances in Multiphysics Simulation of MEMS and NEMS* edited by Frangi A., Aluru N., Cercignani C., Mukherjee S., Imperial College Press, London, chap. 12, pp. 427-454, 2008
- C7. Frangi A., Boundary Integral Equations and Fluid-structure Interaction at the Micro-Scale, in *Recent Advances in Boundary Element Methods*, G.D. Manolis and D. Polyzos eds, Springer, ISBN-978-1-4020-9709-6, chap 8, pp. 93-111, 2009
- C8. Frangi A, Fast Stokes Solvers for MEMS, In *Fast Boundary Element Methods in Engineering and Industrial Applications* (Series: *Lecture Notes in Applied and Computational Mechanics*, Vol. 63) Langer, U.; Schanz, M.; Steinbach, O.; Wendland, W.L. (Eds.), ISBN 978-3-642-25669-1, pp. 221-240, Springer, 2012

Papers in Journals

- J1. Frangi A., A new regularized BE formulation for Kirchhoff plates, *European Journal of Mechanics, Solids*, 5, pp. 915-931, 1996
- J2. Frangi A., Novati G., Symmetric BE method in two dimensional elasticity: evaluation of double integrals for curved elements, *Computational Mechanics*, 19, pp. 58-68, 1996

- J3. Frangi A., Regularized BE formulations for the analysis of fractures in thin plates, *International Journal of Fracture*, 84, pp. 351-366, 1997
- J4. Frangi A., Regularized BE approaches for axisymmetric problems, *Slovak Journal of Mechanical Engineering*, 5, pp. 338-350, 1997
- J5. Frangi A., Bonnet M., A Galerkin symmetric and direct BIE method for Kirchhoff elastic plates: formulation and implementation, *International Journal for Numerical Methods in Engineering*, 41, pp. 337-369, 1998
- J6. Frangi A., BE formulations for 2D scalar wave problems: regularization of singular integrals via the derivative transfer technique, *Mechanics Research Communications*, 25, pp. 305-312, 1998
- J7. Frangi A., Novati G., Regularized symmetric Galerkin BIE formulations in the Laplace transform domain for 2D problems, *Computational Mechanics*, 22, pp. 50-60, 1998
- J8. Maier G., Frangi A., Symmetric boundary element method for "discrete" crack modelling of fracture processes, *Computer Assisted Mechanics and Engineering Science*, 5, pp. 201-226, 1998
- J9. Frangi A., Novati G., On the numerical stability of time-domain elastodynamic analyses by BEM, *Computer Methods in Applied Mechanics and Engineering*, 173, pp. 403-417, 1999
- J10. Frangi A., Maier G., Dynamic elastic-plastic analysis by a symmetric Galerkin boundary element method with time-independent kernels, *Computer Methods in Applied Mechanics and Engineering*, 171, pp. 281-308, 1999
- J11. Frangi A., Elastodynamics by BEM: a new direct formulation, *International Journal for Numerical Methods in Engineering*, 45, pp. 721-740, 1999
- J12. Frangi A., Guiggiani M., Boundary element analysis of Kirchhoff plates with direct evaluation of hypersingular integrals, *International Journal for Numerical Methods in Engineering*, 46, pp. 1845-1863, 1999
- J13. Frangi A., "Causal" shape functions in the time domain boundary element method, *Computational Mechanics*, 25, 533-541, 2000
- J14. Frangi A., Guiggiani M., A direct approach for boundary integral equations with high-order singularities, *International Journal for Numerical Methods in Engineering*, 49, 871-898, 2000
- J15. Frangi A., Guiggiani M., Free terms and compatibility conditions for 3D hypersingular boundary integral equations, *ZAMM, Z. angew. Math. Mech.*, 81 (10), 651-664, 2001
- J16. Frangi A., Novati G., Springhetti R., Rovizzi M., 3D fracture analysis by the symmetric Galerkin BEM, *Computational Mechanics*, 28, 220-232, 2002
- J17. Frangi A., Fracture propagation in 3D by the symmetric boundary element method, *International Journal of Fracture*, 116, 313-330, 2002
- J18. Frangi A., Novati G., BEM-FEM coupling for 3D fracture mechanics applications, *Computational Mechanics*, 32, 415-422, 2003
- J19. Corigliano A., De Masi B., Frangi A., Comi C., Villa A., Marchi M., Mechanical characterization of polysilicon through on chip tensile test, *Journal of Micro-electro-mechanical Systems JMEMS*, vol 13, pp. 200-219, 2004
- J20. Frangi A., Faure Ragani P., Ghezzi L., Magneto-mechanical simulations by a coupled Fast Multipole Method - Finite Element Method and multigrid solvers, *Computers & Structures*, vol 83, pp 718-726, 2005
- J21. Frangi A., Di Gioia A., Multipole BEM for the evaluation of damping forces on MEMS, *Computational Mechanics*, 37, 24-31, 2005
- J22. Frangi A., Corigliano A., M. Binci, P. Faure, Finite element modelling of a rotating piezoelectric ultrasonic motor, *Ultrasonics*, 43, 747-755, 2005
- J23. Frangi A., Tausch J., A qualocation enhanced approach for Stokes flow problems with rigid-body boundary conditions, *Engineering Analysis with Boundary Elements*, 29, 886-893, 2005
- J24. Frangi A., A fast multipole implementation of the qualocation mixed-velocity-traction approach for exterior Stokes flows, *Engineering Analysis with Boundary Elements*, 29, 1039-1046, 2005
- J25. Frangi A., On a robust BEM formulation for the Dirichlet problem of exterior Stokes flow, *Mechanics Research Communications*, 33, 329-336, 2006
- J26. Frangi A., Spinola G., Vigna B., On the evaluation of damping in MEMS in the slip-flow regime, *International J. Numerical Methods in Engineering*, 68, 1031-1051, 2006
- J27. Frangi A., Ghezzi L., Faure-Ragani P., Accurate Force Evaluation for Industrial Magnetostatics Applications with Fast BEM-FEM Approaches, *CMES*, 15, 41-48, 2006
- J28. Cercignani C., Frangi A., Lorenzani S., Vigna B., BEM approaches and simplified kinetic models for the analysis of damping in deformable MEMS, *Engineering Analysis with Boundary Elements*, 31, pp. 451-457, 2007
- J29. Lorenzani S., Gibelli L., Frezzotti A., Frangi A., Cercignani C., Kinetic approaches to gas flow in microchannels, *Nanoscale and Microscale Thermophysical Engineering*, 11, 211-226, 2007
- J30. Frangi A., Frezzotti A., Lorenzani S., On the application of the BGK kinetic model to the analysis of gas-structure interactions in MEMS, *Computer & Structures*, 85, 810-817, 2007
- J31. Corigliano A., Cacchione F., Frangi A., Zerbini S., Numerical modelling of impact rupture in polysilicon Microsystems, *Computational Mechanics*, 42, 251-258, 2008
- J32. Corigliano A., Cacchione F., Frangi A., Zerbini S. Numerical simulation of impact-induced rupture in polysilicon MEMS, *Sensors & Letters*, 6, 35-42, 2008
- J33. Cercignani C., Frangi A., Frezzotti A., Ghiroldi G.P., Gibelli L., Lorenzani S., On the application of the Boltzmann equation to the simulation of fluid structure interaction in MEMS, *Sensors & Letters*, 6, 121-129, 2008
- J34. Frangi A., Ghisi A., Frezzotti A., Analysis of gas flow in MEMS by a deterministic 3D BGK kinetic model, *Sensors & Letters*, vol. 6, pp. 57-68, 2008
- J35. Ardito R., Comi C., Corigliano A., Frangi A., Solid damping in Micro-Electro- Mechanical Systems, *Meccanica*, vol. 43, pp. 419-428, 2008
- J36. Frangi A., Analysis of fluid-structure interaction in low pressure MEMS by Integral Equations, *PAMM Proc. Appl. Math. Mech.*, vol 8, pp. 10007 - 10010, 2008

- J37. Frangi A., Ghisi A., Coronato L., On a deterministic approach for the evaluation of gas damping in inertial MEMS in the free-molecule regime, *Sensor & Actuators A*, 149, 21–28, 2009
- J38. Frangi A., BEM technique for free-molecule flows in high frequency MEMS resonators, *Engineering Analysis with Boundary Elements*, 33, 493–498, 2009
- J39. Frangi A, Pagani M., Perego U. and Borsari R, Directional Cohesive Elements for the Simulation of Blade Cutting of Thin Shells, *CMES*, vol.57, no.3, pp.205-224, 2010
- J40. Frangi A. Bonnet M., On the Fast Multipole Method for the Helmholtz equation with complex frequency, *CMES*, vol.58, no.3, pp.271-291, 2010
- J41. Cremonesi M., Frangi A., Perego U., A Lagrangian Finite Element Approach for the analysis of fluid-structure interaction problems, *International Journal for Numerical Methods in Engineering*, vol 84, pp. 610–630, 2010
- J42. Ardito R., Corigliano A., Frangi A. Multiscale Finite Element models for predicting spontaneous adhesion in MEMS, *Mécanique & Industries*, 11, 177–182, 2010
- J43. Cremonesi M., Ferrara L., Frangi A., Perego U., Simulation of the flow of fresh cement suspensions by a Lagrangian Finite Element approach. *Journal of Non-Newtonian Fluid Mechanics*, 165, pp. 1555–1563, 2010
- J44. Cremonesi M., Frangi A., Perego U., A Lagrangian Finite Element approach for the simulation of water-waves induced by landslides, *Computer and Structures*, 89, 1086–1093, 2011
- J45. Y.J. Liu, S. Mukherjee, N. Nishimura, M. Schanz, W. Ye, A. Sutradhar, E. Pan, N. A. Dumont, A. Frangi. A. Saez, Recent Advances and Emerging Applications of the Boundary Element Method, *Applied Mechanics Reviews*, vol. 64, 031001-1, 2011
- J46. Ardito R., Frangi A., Corigliano A., De Masi B., Cazzaniga G., The effect of nano-scale interaction forces on the premature pull-in of real-life Micro-Electro-Mechanical Systems, *Microelectronics Reliability*, 52, 271–281, 2012
- J47. Ferrara L. Cremonesi M., Tregger N., Frangi A., Shah S. , On the identification of rheological properties of cement suspensions: Rheometry, Computational Fluid Dynamics modeling and field test measurements, *Cement and Concrete Research*, 42, pp. 1134–1146, 2012
- J48. Aimi A., Diligenti M., Frangi A., Guardasoni C., A stable 3D energetic Galerkin BEM approach for wave propagation interior problems, *Engineering Analysis with Boundary Elements*, 36, pp. 1756-1765, 2012
- J49. Langfelder G., Buffa C., Frangi A., Longoni A., Lasalandra E., Mazzola R., Tocchio A., Z-axis magnetometers for MEMS inertial measurement units using an industrial process, *IEEE Transactions On Industrial Electronics*, 60, pp 3983-3990, 2013
- J50. Frangi A., Bugada A., Martello M., Savadkoobi P.T., Validation of PML-based models for the evaluation of anchor dissipation in MEMS resonators, *European Journal of Mechanics*, 37, pp. 256-265, 2013
- J51. Aimi A., M. Diligenti A. Frangi C. Guardasoni, Neumann exterior wave propagation problems: computational aspects of 3D energetic Galerkin BEM, *Computational Mechanics*, 51, pp 475–493, 2013
- J52. Frangi A, M. Cremonesi, A. Jaakkola, T. Pensala, Analysis of anchor and interface losses in piezoelectric MEMS resonators, *Sensor & Actuators A*, vol. 190, pp 127–135, 2013
- J53. R. Ardito, L. Baldassarre, A. Corigliano, B. De Masi, A. Frangi, L. Magagnin, Experimental evaluation and numerical modeling of adhesion phenomena in polysilicon MEMS, *Meccanica*, vol. 48, pp. 1835–1844, 2013
- J54. R. Ardito, A. Corigliano, A. Frangi, Modelling of spontaneous adhesion phenomena in micro-electromechanical-systems, *European Journal of Mechanics A/Solids*, vol. 39, pp. 144-152, 2013
- J55. Aimi A., Diligenti M., Frangi A. and Guardasoni C., Energetic BEM–FEM coupling for wave propagation in 3D multidomains, *Int. J. Numer. Meth. Engng*, vol. 97, pp. 377–394, 2014
- J56. Ardito R., Corigliano A., Frangi A., Rizzini F., Advanced models for the calculation of capillary attraction in axisymmetric configurations, *European Journal of Mechanics, A/Solids*, vol 47, pp. 298-308, 2014
- J57. A. Corigliano, R. Ardito, C. Comi, A. Frangi, A. Ghisi, S. Mariani, Microsystems and mechanics (23rd International Congress of Theoretical and Applied Mechanics), *Procedia IUTAM*, vol 10, pp 138 – 160, 2014
- J58. H. Djizanne, P. Bérest, B. Brouard and A. Frangi, Blowout in Gas Storage Caverns, *Oil & Gas Science and Technology – Rev. IFP Energies nouvelles*, 69 1251-1267, 2014
- J59. M Cremonesi, A Frangi, C Cassella, G Piazza, Enhancement of the Quality Factor of AlN Contour Mode Resonators by Acoustic Reflection: Numerical Design and Experimental Investigation, *Procedia Engineering* 87, 468-471, 2014
- J60. Segovia-Fernandez J., Cremonesi M., Cassella C., Frangi A., Piazza G., Anchor Losses in AlN Contour Mode Resonators, *IEEE JMEMS*, vol. 24, no. 2, April 2015, pp. 265-275, 2015
- J61. Attilio Frangi, Giacomo Laghi, Giacomo Langfelder, Paolo Minotti, and Sarah Zerbini, Optimization of Sensing Stators in Capacitive MEMS Operating at Resonance, *JMEMS*, vol. 24, no. 4, pp 1077-1084, 2015
- J62. A Frangi, B De Masi, F Confalonieri, S Zerbini, Threshold Shock Sensor Based on a Bistable Mechanism: Design, Modeling, and Measurements, *Journal of Microelectromechanical Systems*, 24 (6), 2019-2026, 2015
- J63. B Brouard, P Bérest, A Frangi, Mechanical stability of a cavern submitted to high-frequency cycles, *Journal of Earth Engineering*, 1 (1), 13-28, 2016
- J64. Ardito R., Frangi A., Rizzini F., Corigliano A., Evaluation of adhesion in microsystems using equivalent rough surfaces modeled with spherical caps, *European Journal of Mechanics, A/Solids*, Volume 57, pp. 121-131, 2016
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