



Professor Carlos A. Felippa

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<http://www.worldcat.org/identities/np-felippa,%20carlos%20a>

Aerospace Engineering Sciences
University of Colorado, Boulder

Focus Area: Structural & Material Systems

Education:

Ph.D., Civil Engineering, University of California, Berkeley, 1966

M.S., Civil Engineering, University of California, Berkeley, 1964

Ingeniero Civil, University Nacional de Cordoba (Argentina), 1963

Professional Experience:

1986-Present, Professor of Aerospace Engineering, University of Colorado, Boulder, Colorado

1989-1991, Director, Center for Space Structures and Controls

1986-1988, Associate Director;

1971-1976, Research Scientist; 1976-1980, Staff Scientist; 1980-1986, Senior Staff Scientist, Applied Mechanics Laboratory, Lockheed Missiles and Space Co., Lockheed Palo Alto Res. Lab., Palo Alto, CA.

1968-1969, Research Specialist; 1969-1970, Research Engineer, Structural Analysis Research Group, The Boeing Co., Commercial Airplane Division, Seattle, WA.

1964-1966, Research Assistant; 1966-1968, Post-Doctoral Research Associate; Department of Civil Engineering, University of California, Berkeley, CA.

Honors and Awards:

Duarte y Quirós prize to top Ingeniero Civil graduate, Universidad Nacional de Córdoba, 1963.

Control Data Corp. PACER Fellowship PI, 1986–1988.

AGARD Lecturer at ONERA (Paris, France), and LTAS (Lie`ge, Belgium), 1988.

McDonald-Douglas Foundation Award to set up Structural Dynamics and Control Laboratory, Dec 1991.

SAE Arch. T. Colwell Merit Award, September 1993

NTNF Visiting Scholar Fellowship, August–December 1993.

Fellow, US Association of Computational Mechanics (USACM), July 1995.

Alexander von Humboldt Research Award, selected 1995, conferred 1997.

Honorary Member, Argentine Association of Computational Mechanics, 1997.

Fellow, International Association of Computational Mechanics (IACM), July 1998.

Computational Sciences Award, US Association of Computational Mechanics, August 1999.

Summer Faculty Fellowship, Sandia National Laboratories, Albuquerque, June-August 2001.

Foreign Investigator Fellowship, Ministerio de Educacion y Cultura, Madrid, Spain, to support Visiting Scientist status for research at CIMNE, Barcelona, Spain, May-July 2002, May-June 2005, May-June 2006 and May-June 2007.

Sociedad de Metodos Numericos en Ingenieria (SEMNI) Prize, Madrid, June 2002

Visiting Faculty Award, Conservatoire National des Arts et Metiers (CNAM), Paris, May-July 2004.

NASA Software Development Award, NASA Langley RC, announced 2006, awarded 2007.

Elected Permanent Member-at-Large, USACM Executive Committee, 2007.

IACM Computational Mechanics Award, awarded at WCCM9, Sydney, Australia, July 2010.

Research Interests:

Nonlinear and dynamic structural analysis, finite element methods, software architectures for engineering computations, parallel processing. Special interest in coupled field problems: elastoacoustics, aeroelasticity, control-structure interaction, thermomechanics and electrothermomechanics

Regular Course Offerings at the University of Colorado:

Introduction to Finite Element Methods (ASEN 5007): 3-credit core graduate course, offered every year.

Nonlinear Finite Element Methods (ASEN 5107): 3-credit Technical Elective graduate course

Advanced Finite Element Methods (ASEN 5367): 3-credit Technical Elective graduate course

Structures (ASEN 3112): 4-credit core junior course

Books in Preparation:

Introduction to Finite Element Methods, approx. 700 pp., based on course ASEN 5007.

Geometrically Nonlinear Finite Element Methods, approx. 650 pp., based on course ASEN 5017.

Advanced Linear Finite Element Methods, approx. 550 pp., based on course ASEN 5367.

Publications:

1. C. A. Felippa, K. C. Park and M. R. Ross, A classification of interface treatments for FSI, contributed Chapter to H-J. Bungartz, M. Mehl and M. Schafer (eds.), Fluid Structure Interaction, Lecture Notes in Computational Science and Engineering 73, Chapter 2, pp 27–52, Springer-Verlag, 2010.
2. K. C. Park, R. Ohayon, C. A. Felippa and J. A. Gonzalez, Partitioned Formulation of Internal and Gravity Waves Interacting with Flexible Structures, *Comp. Meth. Appl. Mech. Engrg.*, accepted for publication, 2009, posted online at <http://dx.doi.org/10.1016/j.cma.2009.11.005>.
3. K. C. Park, C. A. Felippa and R. Ohayon, The principal D'Alembert-Lagrange equations and applications to flexible floating systems, *Int. J. Numer. Meth. Engrg.*, Vol. 77, 2009, 1072–1099
4. M. R. Ross, M. A. Sprague, C. A. Felippa and K. C. Park, Treatment of acoustic fluid-structure interaction by localized Lagrange multipliers and comparison to alternative interface coupling methods, *Computer Methods in Applied Mechanics and Engineering* 198, 986–1005, Feb 2009.
5. N. dal Cortivo, C. A. Felippa, H. Bavestrello and W. T. M. Silva, Plastic buckling and collapse of thin shell structures, using layered plastic modeling and co-rotational ANDES finite elements, *Comp. Meth. Appl. Mech. Engrg.*, 198, 785-798. Jan 2009.
6. C. A. Felippa and K. C. Park, Model-based partitioned analysis of coupled problems, chapter 4 in *Computational Aspects of Structural Dynamics and Vibrations*, ed. by G Sandberg and R. Ohayon, CISM Courses and Lectures, vol. 505, Springer-Verlag, Berlin, 2008, 171–216.
7. M. R. Ross, C. A. Felippa, K. C. Park and M. A. Sprague, Treatment of acoustic fluid-structure interaction by localized Lagrange multipliers: Formulation, *Comp. Meth. Appl. Mech. Engrg.*, 197, 2008, 3057–3079.
8. E. Oñate and C. A. Felippa, Variational formulation of the FIC equations for solid mechanics and reaction-diffusion problems, *Comp. Meth. Appl. Mech. Engrg.*, submitted.
9. J. A. González, K. C. Park and C. A. Felippa FEM and BEM coupling in elastostatics using localized Lagrange multipliers, *Int. J. Numer. Meth. Engrg.*, 69, 2058–2074, 2007.
10. C. A. Felippa and E. Oñate, Nodally exact Ritz discretizations of 1D diffusion-absorption and Helmholtz equations by variational FIC and modified equation methods, *Comput. Mech.*, 39, 91–112, 2007.
11. C. A. Felippa and K. C. Park, Synthesis tools for structural dynamics and partitioned analysis of coupled systems, chapter in *Engineering Structures under Extreme Conditions*, ed. by A. Ibrahimbegovic and B. Brank, IOS Press, Amsterdam, 50-110, 2006.
12. K. C. Park, C. A. Felippa and R. Ohayon, Reduced order modeling in coupled systems: formulations and computational algorithms, chapter in *Engineering Structures under Extreme Conditions*, ed. by A. Ibrahimbegovic and B. Brank, IOS Press, Amsterdam, 267-289, 2006.
13. C. A. Felippa, Construction of customized mass-stiffness pairs using templates, invited contribution to Special Issue in honor of A. K. Noor, *ASCE J. Aerospace*, 19:4, 241–258, 2006.
14. C. A. Felippa, Supernatural QUAD4: a template formulation, invited contribution to J. H. Argyris Memorial Issue, *Comp. Meth. Appl. Mech. Engrg.*, 195, 5316–5342, 2006.
15. J. A. González, K. C. Park, C. A. Felippa Partitioned formulation of frictional contact problems using

localized Lagrange multipliers, *Commun. Numer. Meths. Engrg.*, 22, 319–333, 2006.

16. C. A. Felippa and B. Haugen, A unified formulation of small-strain corotational finite elements: I. Theory, *Comp. Meth. Appl. Mech. Engrg.*, 194, 2285–2336, 2005.

17. C. A. Felippa, K. C. Park and M. R. Ross, Maintaining unconditional stability in partitioned analysis methods for coupled systems, invited plenary lecture, *Proc. Computational Methods for Coupled Problems in Science and Engineering II*, ed. by E. Oñate, M. Papadrakakis and B. Schrefler, CIMNE, Barcelona, 2005, 52–55.

18. C. A. Felippa and K. C. Park, Underwater shock analysis on stiffened shells: the source of staggered solution procedures, abstract in *Proc. 5th IACM Int. Conf. on Computation of Shells and Spatial Structures*, ed. by E. Ramm, W. A. Wall, K.-U. Bletzinger, and M. Bischoff, TU Munchen Press, 2005; extended abstract in CDROM.

19. C. A. Felippa and E. Oñate, Nodally exact Ritz discretizations by variational FIC, *Proceedings MekIT'05 3rd National Conference on Computational Mechanics (invited lecture)*, held at Trondheim, Norway, 23–42, May 2005.

20. C. A. Felippa and K. C. Park, Taming complexity in the synthesis of partitioned analysis methods for coupled systems, abstract in *Proc. Computational Methods for Coupled Problems in Science and Engineering*, ed. by M. Papadrakakis, E. Oñate and B. Schrefler, CIMNE, Barcelona, 2005; full paper in CDROM.

21. C. A. Felippa, The amusing history of shear flexible beam elements, *IACM Expressions*, Issue 17, 15–19, Jan 2005.

22. C. A. Felippa and E. Oñate, Volumetric constraint models for anisotropic elastic solids, *J. Appl. Mech.*, 71, No. 5, 731-734, 2004.

23. C. A. Felippa, A compendium of FEM integration rules for finite element work, *Engrg. Comp.*, 21, 867–890, 2004.

24. C. A. Felippa, Optimal plate bending component for a thin-shell element, *Proceedings 6th World Congress in Computational Mechanics*, Beijing, China, Sept 5-10, 2004.

25. C. A. Felippa, A template tutorial, Chapter in *Computational Mechanics - Theory and Practice*, ed. by K.M. Mathisen, T. Kvamsdal and K.M. Okstad, CIMNE, Barcelona, Spain, 2004.

26. C. A. Felippa and K. C. Park, Synthesis tools for structural dynamics and partitioned analysis of coupled systems, Keynote paper chapter in *Multi-Physics and Multi-Scale Computer Models in Nonlinear Analysis and Optimal Design of Engineering Structures under Extreme Conditions*, ed. by A. Ibrahimbegovic and B. Brank, *Proceedings NATO-ARW PST ARW980268*, Ljubliana, Slovenia, 2004, 50-110.

27. K. C. Park, C. A. Felippa and R. Ohayon, Reduced order modeling in coupled systems: formulations and computational algorithms, Keynote paper chapter in *Multi-Physics and Multi-Scale Computer Models in Nonlinear Analysis and Optimal Design of Engineering Structures under Extreme Conditions*, ed. by A. Ibrahimbegovic and B. Brank, *Proceedings NATO-ARW PST ARW980268*, Ljubliana, Slovenia, 267-289, 2004.

28. C. A. Felippa, A study of optimal membrane triangles with drilling freedoms, *Comp. Meth. Appl. Mech. Engrg.*, Vol. 192, pp. 2125–2168, 2003.

29. C. A. Felippa and E. Oñate, Stress, Strain and energy splittings for anisotropic elastic solids under volumetric constraints, *Computers & Structures*, 81, 1343-1358, 2003.

30. C. A. Felippa, A distortion insensitive four noded membrane quadrilateral that passes the patch test, in *Computational Fluid and Solid Mechanics*, ed. by K. J. Bathe et al., Elsevier Sci. Pubs., Amsterdam, 2003.

31. C. A. Felippa, The SS8 solid shell element: formulation and a Mathematica implementation, Center for Aerospace Structures, College of Engineering, University of Colorado, Report CU-CAS-02-03, March 2002, submitted for publication.

32. C. A. Felippa, The SS8 solid shell element: A Fortran implementation, Center for Aerospace Structures,

College of Engineering, University of Colorado, Report CU-CAS-02-04, March 2002, submitted for publication.

33. C. A. Felippa and E. Oñate, Volumetric constraint models for anisotropic elastic solids, Center for Aerospace Structures, College of Engineering, University of Colorado, Report CU-CAS-02-08, July 2002, submitted for publication.
34. C. A. Felippa, A study of optimal membrane triangles with drilling freedoms, *Comp. Meth. Appl. Mech. Engrg.*, 192, 2125–2168, 2003.
35. C. A. Felippa and E. Oñate, Stress, strain and Energy splittings for anisotropic elastic solids under volumetric constraints, *Computers & Structures*, 81, 1343–1358, 2003.
36. C. A. Felippa, A Template Tutorial: Panels, families, clones, winners and losers, Center for Aerospace Structures, College of Engineering, University of Colorado, Report CU-CAS-02-17, Sept 2002, converted into a Template tutorial.
37. C. A. Felippa and K. C. Park, Fitting strains and displacements by minimizing dislocation energy, *Proceedings of the Sixth International Conference on Computational Structures Technology*, Prague, Czech Republic, September 2002, pp. 49-51 (complete text in CDROM)
38. C. A. Felippa, A History of matrix structural analysis: a play in 3 acts, Plenary Lecture, *Proceedings Conferencia sobre Métodos Numéricos en Ingeniería V*, Madrid, Spain, June 2002, SEMNI, Barcelona, 2002
39. G. Rebel, K. C. Park, C. A. Felippa, A contact formulation based on localized Lagrange multipliers: formulation and applications to two-dimensional problems, *Int. J. Numer. Meth. Engrg.*, 54, 263–297, 2002.
40. K. C. Park, C. A. Felippa and G. Rebel, A simple algorithm for localized construction of non-matching structural interfaces, *Int. J. Numer. Meth. Engrg.*, 53, 1261–1285, 2002.
41. C. A. Felippa and K. C. Park, The construction of free-free flexibility matrices for multilevel structural analysis, *Comp. Meth. Appl. Mech. Engrg.*, 191, 2111–2140, 2002.
42. C. A. Felippa, Fraeijs de Veubeke: neglected discoverer of the "Hu-Washizu Functional," *IACM Expressions*, May 2002.
43. C. A. Felippa, A historical outline of matrix structural analysis: a play in three acts, *Computers & Structures*, 79, 1313-1324, 2001.
44. K. C. Park, C. A. Felippa and R. Ohayon, Localized formulation of multibody systems, in *Computational Aspects of Nonlinear Systems with Large Rigid Body Motion* ed. by J. Ambrosio and M. Kleiber, NATO Science Series, IOS Press, 2001, 253–274.
45. C. A. Felippa, K. C. Park and G. Rebel, An inverse-free interface patch test for nonmatching FEM meshes, *Proc. First MIT Conf. Computational Solid and Fluid Mechanics*, Elsevier, 2001
46. C. A. Felippa, Optimal triangular membrane elements with drilling freedoms, *Proc. First MIT Conf. Computational Solid and Fluid Mechanics*, Elsevier, 2001
47. C. A. Felippa, Customizing high performance elements by Fourier methods, *Trends in Computational Mechanics*, ed. by W. A. Wall, K.-U. Bleitzinger and K. Schweizerhof, CIMNE, Barcelona, Spain, 283-296, 2001.
48. K. C. Park, C. A. Felippa and G. Rebel, Interfacing nonmatching finite element discretizations: the zero moment rule, in *Trends in Computational Mechanics*, ed. by W. A. Wall, K.-U. Bleitzinger and K. Schweizerhof, CIMNE, Barcelona, Spain, 355–367, 2001.
49. K. C. Park, C. A. Felippa and R. Ohayon, Partitioned formulation of internal fluid-structure interaction problems via localized Lagrange multipliers, *Comp. Meth. Appl. Mech. Engrg.*, 190, 2989–3007, 2001.
50. C. A. Felippa, K. C. Park and C. Farhat, Partitioned analysis of coupled mechanical systems, Invited Plenary Lecture, 4th World Congress in Computational Mechanics, Buenos Aires, Argentina, July 1998, expanded version: *Comp. Meth. Appl. Mech. Engrg.*, 190, 3247–3270, 2001.
51. C. A. Felippa, Customizing the mass and geometric stiffness of plane thin beam elements by Fourier methods, *Engrg. Comp.*, 18, 286–303, 2001.

52. C. A. Felippa, Recent advances in finite element templates, Chapter 4 in *Computational Mechanics for the Twenty-First Century*, ed. by B.H.V. Topping, Saxe-Coburn Publications, Edinburgh, 71–98, 2000.
53. C. A. Felippa, A systematic approach to the element-independent corotational dynamics of finite elements, *Proc. IASS-IACM 2000, Fourth International Colloquium on Computation of Shell and Spatial Structures*, Chania-Crete, Greece, June 4–7, 2000.
54. K. C. Park, U. Gumaste and C. A. Felippa, A localized version of the method of Lagrange multipliers and its applications, *Comput. Mech.*, 24/6 476–490, 2000.
55. K. C. Park and C. A. Felippa, A variational principle for the formulation of partitioned structural systems, *Int. J. Numer. Meth. Engrg.*, 47, 395–418, 2000.
56. C. A. Felippa, On the original publication of the general canonical functional of linear elasticity, *J. Appl. Mech.*, 67/1, 217–219, 2000.
57. C. A. Felippa, Recent developments in basic finite element technologies, in *Computational Mechanics in Structural Engineering - Recent Developments*, ed. by F. Y. Cheng and Y. Gu, Elsevier, Amsterdam, 141–156, 1999.
58. C. A. Felippa and C. Militello, Construction of optimal 3-node plate bending elements by templates, *Comput. Mech.*, 24/1, 1–13, 1999.
59. K. C. Park and C. A. Felippa, A variational framework for solution method development in structural mechanics, *J. Appl. Mech.*, 65/1, 242–249, 1998.
60. C. A. Felippa and C. Militello, Construction of optimal plate bending triangles by templates, in *Modeling and Simulation Based Engineering*, ed. by S. N. Atluri and P. E. O’Donoghue, Tech Science Press, Palmdale, CA, 260–265, 1998.
61. K. C. Park and C. A. Felippa, A flexibility-based inverse algorithm for identification of structural joint properties, in *Computational Methods on Inverse Problems*, ed. by L. Olson, ASME, New York, 1998.
62. C. A. Felippa, ETA expressions for the high frequency impedance of a uniformly pulsating submerged torus, in *Computational Methods for Unbounded Domains*, ed. by T. L. Geers, Kluwer Academic Publishers, Dordrecht, Holland, 103–110, 1998.
63. F. J. Brito-Castro, C. Militello and C. A. Felippa, Parametrized variational principles in dynamics applied to the optimization of dynamic models of plates, *Computational Mechanics*, 20, 285–294, 1997.
64. C. A. Felippa, K. C. Park and M. R. Justino Filho, The construction of free-free flexibility matrices as generalized stiffness inverses, *Computers & Structures*, 88, 411–418, 1997.
65. C. A. Felippa and K. C. Park, A direct flexibility method, *Comp. Meth. Appl. Mech. Engrg.*, 149, 319–337, 1997.
66. K. C. Park, M. R. Justino Filho and C. A. Felippa, An algebraically partitioned FETI method for parallel structural analysis: algorithm description, *Int. J. Numer. Meth. Engrg.*, 40, 2717–2737, 1997.
67. M. R. Justino Filho, K. C. Park, and C. A. Felippa, An algebraically partitioned FETI method for parallel structural analysis: implementation and numerical performance evaluation, *Int. J. Numer. Meth. Engrg.*, 40, 2739–2758, 1997.
68. C. A. Felippa, Selected applications of massively parallel processors in computational mechanics, *Advances in Computational Mechanics*, ICES Publications, Atlanta, GA, 614–620, 1997.
69. C. A. Felippa, Recent progress in parametrized variational principles for mechanics, *Comput. Mech.*, 11, 443–461, 1996.
70. C. A. Felippa, Unificacion parametrica del analisis estructural: formulacion clásica y elementos mixtos d-conectados, *Revista Internacional de Metodos Numericos en Ingenieria*, 12, 371–410, 1996.
71. U. Gumaste and C. A. Felippa, 3D analysis of fluid-structure interaction phenomena in aircraft engines, *Proceedings Fourth US National Congress in Computational Mechanics*, San Francisco, CA USACM Press, p. 235, 1997.

72. K. C. Park and C. A. Felippa, A variational framework for methods developments in structural mechanics, Proceedings Fourth US National Congress in Computational Mechanics, San Francisco, CA August 1997, USACM Press, p. 465
73. B. Haugen and C. A. Felippa, A unified formulation of co-rotational finite elements: I. Theory, II. Applications, CAS Report, August 1995.
74. C. A. Felippa, Parametrized unification of matrix structural analysis: classical formulation and d-connected mixed elements, *Finite Elem. Anal. Design*, 21, 45–74, 1995.
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76. C. A. Felippa, L. A. Crivelli and B. Haugen, A Survey of the core-congruential formulation for geometrically nonlinear TL finite elements, *Archives of Computational Methods in Engineering*, 1, 1–48, 1994.
77. C. A. Felippa, C. Farhat and K. C. Park, Research in grand challenge coupled problems in computational mechanics, invited address, Proc. Third World Congress in Computational Mechanics, Chiba, Japan, 554– 555, 1994.
78. C. A. Felippa, Finite Element Templates: Recent developments and applications to element-level error estimation, invited Keynote Lecture, Proc. Third World Congress in Computational Mechanics, Chiba, Japan, 1432–1437, 1994.
79. C. A. Felippa, B. Haugen and C. Militello, Finite element templates, Proc. Third World Congress in Computational Mechanics, Chiba, Japan, 1798–1799, 1994.
80. J. J. Schuler and C. A. Felippa, Superconducting finite elements based on a gauged potential variational principle, I. Formulation, *J. Comput. Syst. Engrg*, 5, 215–225, 1994.
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82. C. A. Felippa, An Appreciation of R. Courant’s ‘Variational Methods for the Solution of Problems in Equilibrium and Vibrations,’ *Int. J. Numer. Meth. Engrg.*, 37, 643–645, 1994.
83. C. A. Felippa, A survey of parametrized variational principles and applications to computational mechanics invited Chapter in *Science and Perspectives in Mechanics*, ed. by B. Nayroles, J. Etay and D. Renouard, ENS Grenoble, Grenoble, France, 1–42, 1994; expanded version in *Comp. Meth. Appl. Mech. Engrg.*, 113, 109–139, 1994.
84. J. Cervenka, S. Keating and C. A. Felippa, Comparison of strain recovery techniques for the mixed iterative method, *Comm. Appl. Numerical Math.*, 9, 925–932, 1993.
85. L. A. Crivelli and C. A. Felippa, A total Lagrangian geometrically nonlinear beam element for analysis of three dimensional space structures, *Int. J. Numer. Meth. Engrg.*, 31, 1122–1144, 1993.
86. C. A. Felippa, S. Keating and C. Militello, Implementation of a mesh adaptive scheme based on an element level error indicator, Proceedings 34th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials (SDM) Conference, La Jolla, April 1993
87. C. A. Felippa, L. A. Crivelli and D. Vandenbelt, Configuration-shape-size optimization of space structures by material redistribution, Proceedings 34th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials (SDM) Conference, La Jolla, April 1993.
88. C. Farhat, C. A. Felippa and C. Militello, A hybrid substructuring method and an adaptive refinement scheme for the distributed solution of three-dimensional structural problems, Proc. SAE Conference, Warrendale, Pa, 1993 recipient of Arch T. Colwell Merit Award.
89. C. A. Felippa and J. Schuler, Parametrized variational principles for linear electromagnetodynamics, in *Mechanics of Electromagnetic Materials and Structures*, ed. by J. S. Lee, G. A. Maugin and Y. Shindo, AMD Vol. 161, American Society of Mechanical Engineers, New York, 1993.
90. C. A. Felippa, L. A. Crivelli and D. Vandenbelt, Configuration-shape-size optimization of space

- structures, in *Space Exploration Science and Technologies Research*, ed. by W. J. Craft and D. M. Achgill, AD-Vol 31, American Society of Mechanical Engineers, ASME, New York, 69–82, 1992.
91. K. Alvin, H. M. de la Fuente, B. Haugen and C. A. Felippa, Membrane triangles with corner drilling freedoms: I. The EFF element, *Finite Elem. Anal. Design*, 12, 163–187, 1992.
 92. C. A. Felippa and C. Militello, Membrane triangles with corner drilling freedoms: II. The ANDES element, *Finite Elem. Anal. Design*, 12, 189–201, 1992.
 93. C. A. Felippa and S. Alexander, Membrane triangles with corner drilling freedoms: III. Implementation and performance evaluation, *Finite Elem. Anal. Design*, 12, 203–239, 1992.
 94. C. A. Felippa, Parametrized variational principles for micropolar elasticity, *Int. J. Solids Struc.*, 29, 2709–2721, 1992.
 95. C. A. Felippa Principios variacionales parametrizados para elasticidad micropolar, *Revista Internacional de Métodos Numéricos para Cálculo y Diseño en Ingeniería*, 8, 267–282, 1992.
 96. C. Militello and C. A. Felippa, The individual patch test revisited, in *The Finite Element Method in the 1990s*, ed. by E. Oñate, J. Periaux and A. Samuelsson, 554–564, 1991.
 97. C. A. Felippa and C. Militello, r-Adaptive Methods Based on Element Level Error Estimators for Parallel Analysis of Plates and Shells, presented to First US National Congress on Computational Mechanics, Chicago, July 1991, also in 23rd AIAA/SDM Conference Proceedings, Dallas, April 1992.
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 107. G. Skeie and C. A. Felippa, Detecting and traversing bifurcation points in nonlinear structural analysis, *Journal of Space Structures*, 6, 45–71, 1991.
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Computing Systems in Engineering, 1991.

110. C.A. Felippa, Desarrollos recientes en elementos finitos de alto rendimiento por la formulación libre, *Revista Internacional de Métodos Numéricos para Cálculo y Diseño en Ingeniería*, 7, 65–86, 1991.
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