

Ph.D. 1979 California Institute of Technology Applied Mathematics
B.S. 1975 California Institute of Technology Physics

Doctoral Dissertation

Some effects of spatial nonuniformities in chemically reacting mixtures, thesis, Calif. Inst. of Technology, (1979). Advisor: D.S. Cohen.

Publications:

A Peer Reviewed

a Submitted for publication

- 1 E. A. Burroughs, E. A. Coutsias, and L. A. Romero, *A reduced-order partial differential equation model for dynamics of the flow in a thermosyphon*, submitted to Journal of Fluid Mechanics, (Nov. 2004).
- 2 B. Ho, E. A. Coutsias, C. Seok and K. A. Dill, *The flexibility of the proline ring*, submitted to Protein Science, (Sep. 2004).

b Journal Articles

- 1 E.A. Coutsias, C. Seok and K.A. Dill, *Using quaternions to calculate RMSD*, Journal of Computational Chemistry, 2004, vol 25, pp 1849-1857.
- 2 E. A. Coutsias, C. Seok, M. P. Jacobson and K. A. Dill, *A Kinematic View of Loop Closure*, Journal of Computational Chemistry, 2004, vol 25, pp 510-528.
- 3 D. Sheltraw and E.A. Coutsias, *Invertibility of Current Density from Near-Field Electromagnetic Data*, J. Applied Phys, v94, n8, pp. 5307-5315 (2003).
- 4 H.J.H. Clercx, A.H. Nielsen, D.J. Torres and E.A. Coutsias, *Two-dimensional turbulence in square and circular domains with no-slip walls*, European J. of Mechanics B - Fluids 20(2001), 557-576.
- 5 L. Ketai, C.M. Coutsias, S. Williamson and E.A. Coutsias, *Thin-Section CT Evidence of Bronchial Thickening in Children with Stable Asthma: Bronchoconstriction or Airway Remodeling?*, Academic Radiology, 8(3), p.257-264, (2001).
- 6 K. Bergeron, E.A. Coutsias, J.P. Lynov and A.H. Nielsen, *Dynamical properties of forced shear layers in an annular geometry*, Journal of Fluid Mechanics, 402, p.255-289, (2000).
- 7 J.P. Lynov, K. Bergeron, E.A. Coutsias and A.H Nielsen, *An accurate and efficient spectral method for studies of the dynamical properties of forced, circular shear layers*, Applied Numerical Mathematics, 33, p.175-181, (2000).
- 8 D.J. Torres and E.A. Coutsias, *Pseudospectral Solution of the Two-Dimensional Navier-Stokes Equations in a Disk*, SIAM Journal on Scientific Computing, 21(1), 378-403 (1999).
- 9 E.A. Coutsias and N.D. Kazarinoff, *The Approximate Functional Formula for the Theta Function and Diophantine Gauss Sums*, Transactions of the AMS, 350(2), p.615-641, (1998).
- 10 E.A. Coutsias, M. Wester and A.S. Perelson, *A Nucleation Theory of Cell Surface Capping*, J. Statistical Physics, 87(5/6) p.1179-1203, (1997).
- 11 E.A. Coutsias, T. Hagstrom and D. Torres, *An efficient spectral method for ordinary differential equations with rational function coefficients*, Mathematics of Computation, **65** (216), 611-635, (1996).
- 12 K. Bergeron, E.A. Coutsias, J.P. Lynov and A.H. Nielsen. *Self Organization in 2D Circular Shear Layers*, Physica Scripta T67, 1996, p. 33-37.
- 13 E.A. Coutsias, T. Hagstrom, J.S. Hesthaven and D. Torres, *Integration preconditioners for differential operators in spectral τ -methods*, Houston Journal of Mathematics, 1996, Special Issue (Proceedings of ICOSAHOM 3, Andrew V. Ilin and L. Ridgway Scott, Eds.), p. 21-38.

- 14 E. A. Coutsias, J. S. Hesthaven and J. P. Lynov, *An accurate and efficient spectral tau method for the Navier-Stokes equations in a planar channel*, Houston Journal of Mathematics, 1996, Special Issue (Proceedings of ICOSAHOM 3, Andrew V. Ilin and L. Ridgway Scott, Eds.), p. 39-54
- 15 G. Harel, G. Kurizki, J.K. McIver and E.A. Coutsias, *Optimized preparation of quantum states by conditional measurement*, Phys. Rev. A. 53(6), June 1996, p. 4534–4538.
- 16 B.S. Masson and E.A. Coutsias *Acoustic Wave nonlinearity in stimulated Brillouin scattering*, J.Opt.Soc.Am., B, 1367-1373, (1994).
- 17 H.L. Pécseli, E.A. Coutsias, T. Huld, J.P. Lynov, A.H. Nielsen and J. Juul Rasmussen *Coherent vortical structures in two-dimensional plasma turbulence*, Plasma Phys. Contr. Fusion, **34**, 2065-2070, (1992).
- 18 E.A. Coutsias and J.P. Lynov. *Fundamental interactions of vortical structures with boundary layers in two-dimensional flows*, Physica D51, 482-497, (1991).
- 19 E.A. Coutsias, F.R. Hansen, T. Huld, G. Knorr and J.P. Lynov. *Spectral methods for numerical plasma simulation Physica Scripta*, 40, 270-279, (1989).
- 20 E.A. Coutsias. *Caustics and virtual cathodes in electron beams* J. Plasma Phys., 40(2), 369-384, (1988).
- 21 E.A. Coutsias and N.D. Kazarinoff. *Disorder, renormalizability, theta functions and cornu spirals* Physica, 26D, 295-310, (1987). (reviewed in Math. Reviews, MR 88h#11056 CMP 892 449 by M. Mendes-France)
- 22 A.S. Perelson and E.A. Coutsias. *A moving boundary model of acrosomal elongation* J. Math. Biology, 23, 361-379, (1986).
- 23 E.A. Coutsias and J.K. McIver. *Non relativistic Kapitza-Dirac scattering* Phys. Rev. A, 31, 3155-3168, (1985).
- 24 E.A. Coutsias. *Effects of thermal spread on the space charge limit of an electron beam* J. Plasma Phys., 31, 313-320, (1984).
- 25 E.A. Coutsias and J.C. Neu. *The aging of nuclei in a binary mixture* Physica, 12 D, 295-302, (1984).
- 26 E.A. Coutsias and D.J. Sullivan. *Space charge limit instabilities in electron beams* Phys. Rev. A, 27, 1535, (1983).
- 27 E.A. Coutsias and B.A. Huberman. *Long-time behavior of Ginzburg-Landau systems far from equilibrium* Physical Rev. B, 24, 2592, (1981).
- 28 D.S. Cohen, E.A. Coutsias and J.C. Neu. *Stable oscillations in single species growth models with hereditary effects* Mathematical Biosciences, 44, 255-268, (1979).

c Edited Volumes

- 1 P.M. Alsing, E.A. Coutsias and J.C. McIver, *The Interfacial Behavior of Liquid Water Near Hydrophobic Surfaces: A Parallel Force Decomposition Molecular Dynamics Code*, in *Applications of High-Performance Computing in Engineering VI*, Eds. M. Ingber, C.A. Brebbia and H. Power, WIT Press, Southampton, Boston (2000), p.81-90.
- 2 E.A. Coutsias, J.P. Lynov, A.H. Nielsen, M. Nielsen, J.Juul Rasmusen and B. Stenum. *Vortex Dipoles Colliding with Curved Walls Proc. of "Future Directions in Physical and Biological Systems"*, Lyngby, Denmark, P.L. Christiansen, J.C. Eilbeck, and R.D. Parmentier, eds., Plenum Press, New York, 51-54, (1992).
- 3 J.P. Lynov, E.A. Coutsias, and A.H. Nielsen. *A spectral algorithm in the vorticity - stream function formulation for two-dimensional flows with no-slip walls* *Computational Fluid Dynamics '92*, Vol. 1, Ch. Hirsch, J. Periaux, and W. Kordulla, eds., Elsevier Science Publishers B.V., 413-420, (1992).
- 4 E.A. Coutsias and H. Segur, *A new formulation for dendritic crystal growth in two space dimensions* *Asymptotics beyond All Orders*, H. Segur, H. Levin and S. Tanveer, eds., Plenum Press, New York, 87-104, (1991).

- 5 N.D. Kazarinoff and E.A. Coutsias. *On cornu spirals, disorder, self-similarity, and Jacobi's $\theta_3(U, \tau)$ Bifurcation: Analysis, Algorithms, Applications*, Vol. 79 in International Series of Numerical Mathematics, T. Küpper, R. Seydel, K. H. Troper, eds., Birkhäuser, Berlin, 139-152, (1987).
- 6 T. Bountis and E.A. Coutsias. *On an application of perturbation methods to the Beam-Beam Interaction* Proceedings of the Symposium on Nonlinear Dynamics and the Beam-Beam Interaction, March 19-21, 1979, E. Herrera and M. Month, eds., APS, Brookhaven National Laboratory, 53-61, (1980).

d Book Chapters

- 1 D.J. Sullivan, J.E. Walsh and E.A. Coutsias. *Virtual cathode oscillator (Vircator) theory High-Power Microwave Sources*, Ch.13, V.L. Granatstein and I. Alexeff, eds., Artech House, Boston, 441-505, (1987).

B Conference Proceedings Contributions

- 1 A.H. Nielsen, D.J. Torres and E.A. Coutsias. *Decaying two-dimensional Turbulence in Bounded Flows*, 1998 International Consortium on Plasma Physics (ICPP) and 25th European Physical Society (EPS) Conference on Controlled Fusion and Plasma Physics, Praha, 29 June–3 July, ECA Vol. 22C(1998), 2346–2349.
- 2 J.P. Lynov, E.A. Coutsias and J.S Hesthaven. *New spectral algorithms for accurate simulations of bounded flows*, Proceedings of Eurotherm Seminar 36, "Advanced Concepts and Techniques in Thermal Modelling", Poitiers, France, Sep. 21-23 (1994), pp. N16–N21.
- 3 E.A. Coutsias, K. Bergeron, J.P. Lynov and A.H. Nielsen. *Self Organization in 2D Circular Shear Layers* American Institute of Aeronautics and Astronautics (AIAA) Paper 94-2407, 25th Plasmadynamics and Lasers Conference, June 20-23, 1994, Colorado Springs, CO, p.1-12.
- 4 E.A. Coutsias, T. Huld and J.P. Lynov. *Numerical studies of the evolution of coherent structures in two-dimensional shear flow*, Preprint volume of the Ninth Symposium on Turbulence and Diffusion, April 30-May 3, 1990, Roskilde, Denmark, Published by the American Meteorological Society, Boston, MA, 212-215.
- 5 D.J. Sullivan and E.A. Coutsias. *Virtual cathode formation in electron beams as a bifurcation phenomenon High Power Beams '81*, Proceedings, 4th International Topical Conference on High-Power Electron and Ion-Beam Research and Technology, H.J. Doucet and J.M. Buzzi, Eds., Ecole Polytechnique, Paris, France, 371-378, June 29-July 3, 1981.

C To be submitted

- 1 D. Sheltraw and E.A. Coutsias, *Inverse Magnetometry on thin conducting shells*, To be submitted (2004).
- 2 M. H. Adhikari, E. A. Coutsias, and J. K. McIver, *A spectral method for the accurate solution of certain stiff delay-differential equations*, To be submitted (2004).
- 3 G. von Winckel, E. A. Coutsias, and S. Krishna, *Spectral element modeling of semiconductor heterostructures*, To be submitted (2004).

D Select unpublished writings

- 1 E. A. Coutsias and P.A. Alsing, *Numerical Integration Scheme for md_serial.f*, manual for the molecular dynamics algorithm *md_serial.f* developed for the simulation of water near hydrophobic surfaces, summer 2000.
- 2 E.A. Coutsias and L. Romero, *The Quaternions with an application to Rigid Body Dynamics*, Sandia National Laboratories, Technical Report SAND2004-0153, 2004.