

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.H. Cohen.

### Publications:

#### A Peer Reviewed

##### a Submitted for publication

- 1 E. A. Coutsias, C. Seok, and K. A. Dill, *Using Quaternions to calculate RMSD*, (submitted, December 2003).

##### b Journal Articles

- 1 E. A. Coutsias, C. Seok, M. P. Jacobson and K. A. Dill, *A Kinematic View of Loop Closure*, Journal of Computational Chemistry 25, 510-528, 2004.
- 2 D. Sheltraw and E.A. Coutsias, *Invertibility of Current Density from Near-Field Electromagnetic Data*, J. Applied Phys, v94, n8, pp. 5307-5315 (2003).
- 3 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.
- 4 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).
- 5 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).
- 6 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).
- 7 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).
- 8 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).
- 9 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).
- 10 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).
- 11 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.
- 12 E.A. Coutsias, T. Hagstrom, J.S. Hesthaven and D. Torres, *Integration preconditioners for differential operators in spectral  $\tau$ -methods*, Houston Journal of Mathematics, 1996, Special Issue (Proceedings of ICOSAHOM 3, Andrew V. Ilin and L. Ridgway Scott, Eds.), p. 21-38.
- 13 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

- 14 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.
- 15 B.S. Masson and E.A. Coutsias *Acoustic Wave nonlinearity in stimulated Brillouin scattering*, J.Opt.Soc.Am., B, 1367-1373, (1994).
- 16 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).
- 17 E.A. Coutsias and J.P. Lynov. *Fundamental interactions of vortical structures with boundary layers in two-dimensional flows*, Physica D51, 482-497, (1991).
- 18 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).
- 19 E.A. Coutsias. *Caustics and virtual cathodes in electron beams* J. Plasma Phys., 40(2), 369-384, (1988).
- 20 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)
- 21 A.S. Perelson and E.A. Coutsias. *A moving boundary model of acrosomal elongation* J. Math. Biology, 23, 361-379, (1986).
- 22 E.A. Coutsias and J.K. McIver. *Non relativistic Kapitza-Dirac scattering* Phys. Rev. A, 31, 3155-3168, (1985).
- 23 E.A. Coutsias. *Effects of thermal spread on the space charge limit of an electron beam* J. Plasma Phys., 31, 313-320, (1984).
- 24 E.A. Coutsias and J.C. Neu. *The aging of nuclei in a binary mixture* Physica, 12 D, 295-302, (1984).
- 25 E.A. Coutsias and D.J. Sullivan. *Space charge limit instabilities in electron beams* Phys. Rev. A, 27, 1535, (1983).
- 26 E.A. Coutsias and B.A. Huberman. *Long-time behavior of Ginzburg-Landau systems far from equilibrium* Physical Rev. B, 24, 2592, (1981).
- 27 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 Rasmussen 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 ICPP and 25th 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", Poitier, 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* 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, *The Inverse Magnetometry Problem on a Conducting Shell*, To be submitted (2004).
- 2 E. A. Burroughs, E. A. Coutsias, L. Romero, *A New Model of the Dynamics of the Flow in a Thermosyphon*, To be submitted (2004).
- 3 E. A. Coutsias, M. Adhikarri and J.K. McIver, *A spectral method for the accurate solution of certain stiff delay-differential equations*, To be submitted (2004).

#### D Select unpublished writings

- 1 E.A. Coutsias and L. Romero, *The Quaternions with an application to Rigid Body Dynamics*, Lecture Notes for the Seminar on Dynamics and Stability Theory, Dept. of Mathematics, Univ. of New Mexico, February 1999.
- 2 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.
- 3 E.A. Coutsias and C. Seok, *On the optimal translation–rotation relating two sets of vectors*, Report for the design of an optimal superposition algorithm for optimal comparison of two shapes, developed for incorporation in a protein folding numerical code, Fall 2000.