

Curriculum Vitae
November 16, 2009

WALTER J. GRANTHAM

Professor of Mechanical Engineering
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- VITA** Born February 15, 1944, Oakland, California
Married, 6' 2", 220 lbs.
- ADDRESS** 320 NW Thomas Street
Pullman, Washington 99163
Cell: (509) 336-9511
- EDUCATION** Ph.D. Aerospace Engineering, 1973
University of Arizona, Tucson
Minor: Mathematics
M.S. Aerospace Engineering, 1971
University of Arizona, Tucson
Minor: Mathematics
B.S. Mechanical Engineering, 1968
University of Texas, Arlington
- RESEARCH INTERESTS** Nonlinear and Optimal Control Systems, Differential Games and Game Theory,
Optimal Systems Design, Control of Chaotic Systems, Parallel and Distributed Optimization
- Modeling, Simulation, and Control Applications:
Optimization Algorithms via Differential Equations
Optimization using Radial Basis Function Response Surface Models
Optimization of Explosion Models
Optimal Chaotic Control Systems
Chaos in Discrete-Time Feedback Control Systems
Microburst Wind Shear Modeling
Aeroassisted Orbital Transfer
Biological and Renewable Resource Systems
Aircraft and Missile Trajectory Optimization
Coal Dust Flame Propagation
Optimal Control of Solar Collectors
- HONORS** Sigma Xi Fellow
Tau Beta Pi President, Texas Eta
Pi Tau Sigma Member, Texas Alpha Omega
Epsilon Nu Gamma President, UTA Engineering Honor Soc.
Phi Kappa Theta Member, UTA Scholastic Honor Society
Who's Who America Marquis Whos Who in America, 2010
- AWARDS** Best Paper 11th Int'l. Symposium on Dynamic Games and Applications,
Tucson, AZ, December, 2004
Richard Bellman Award Best Paper, 5th Int'l. Conf. on Mathematical Modelling, 1985,
University of California, Berkeley
A.S.E.E. Faculty Fellow N.A.S.A. Ames Research Center, Summer 1985, 1986
Best Paper 40th Military Operations Research Symposium,
Air Defense Group, Monterey, CA, 1977
NDEA Fellow University of Arizona 1968 – 1971
Univ. Scholarship University of Texas, Arlington 1965 – 1967

ACADEMIC EXPERIENCE	1978 –	Professor (1997) Associate Professor (1983) Assistant Professor (1978) School of Mechanical and Materials Engineering Washington State University Pullman, Washington
	1971 – 1973	Instructor Dept. of Aerospace and Mechanical Engineering University of Arizona Tucson, Arizona
ACTIVITIES	Member	American Inst. of Aeronautics and Astronautics Inst. of Electrical and Electronic Engineers
	Faculty Advisor	A.I.A.A. Student Chapter (Founding) (1996 – 2003) Mini-Baja Car Design
	Visiting Professor	University of Western Australia, Mathematics, Perth, Western Australia (July – October, 1991)
		N.A.S.A. Ames Research Center (A.S.E.E. Fellow) Moffett Field, California (Summer 1985, 1986)
		University of Arizona, Aerospace and Mechanical Engineering, Tucson, Arizona (August – December, 1985)
	Ed. Board	<i>Dynamics and Control: An International Journal</i> Kluwer Academic Pub., Boston, (1990 – 2003)
	Organizer, Chairman	Differential Games I and II A.I.A.A. Guidance, Navigation, and Control Conf., Boston, MA, August 1989.
	Session Chairman	N.S.F./Australia Workshop on Control and Chaos Honolulu, HI, June 1995
		Workshops on Control Mechanics University of Southern California, Los Angeles, CA, January 1989, 1990, 1991
		N.S.F./Australia Workshop on the Dynamics of Complex Interconnected Biological Systems, Albany, Western Australia, January 1989
	Differential Games A.I.A.A. Guidance, Navigation, and Control Conf., Minneapolis, MN, August 1988 Monterey, CA, August 1987.	
Assoc. Ed.	<i>Modeling and Management of Resources under Uncertainty</i> Springer-Verlag, 1987.	
Editor	Engineering Reviews, <i>Mechanical Engineering News</i>	

ACTIVITIES (Continued)

Sabbatical Host Visiting Scholars:

Dr. Michael Fisher (Fall 1989)
Dept. of Mathematics
University of Western Australia

Dr. Phil Diamond (Fall 1989)
Dept. of Mathematics
University of Queensland, Australia

Dr. Ivan Mustakerov (Spring 1985)
Institute for Cybernetics
Bulgarian Academy of Sciences

Dr. Michael Fisher (Fall 1984)
Dept. of Mathematics
University of Western Australia

Reviewer National Science Foundation
John Wiley and Sons
Longman UK Ltd., Monographs in Pure & App. Math.
A.S.M.E. J. of Computational and Nonlinear Dynamics
J. of Global Optimization
Letters in Applied Mathematics
Systems and Control Letters
Optimal Control Applications & Methods
Dynamics and Control
A.S.M.E. J. of Dynamical Systems, Measurement, and Control
Proc. I.E.E.E. Conf. on Decision and Control
Proc. American Controls Conf.
J. of Optimization Theory and Applications
I.E.E.E. Transactions on Automatic Control
International J. of Control
J. of Mathematical Analysis & Applications
J. of Guidance, Control and Dynamics
J. of Applied Mechanics
I.E.E.E. Trans. on Aerospace & Electronic Systems
Canadian J. of Fisheries and Aquatic Sciences
J. of Fisheries Research
Aerospace Science and Technology

UNIVERSITY SERVICE WSU Faculty Senate 1983 – 1985, 1986 – 1990, 1995 – 2001
WSU Library Advisory Committee, 1988
WSU University Planning Committee, 1986 – 1988
WSU Personal Computer Sales, (Chairman) 1984
WSU Honors Council 1980 – 1983, (Chairman) 1982 – 1983
College Faculty Senate Elections, 1998 – 2001
Amer. Inst. Of Aeronautics and Astronautics (Advisor, WSU Student chapter), 1996 – 2003
Faculty Search (Mech. Engr.), (Chairman) 1987 – 1988
Graduate Studies (M.M.E.), 1978 – 1981, 1986 – 1989, 1992 – 1993, 1999 – 2007, 2008–Present
Undergraduate Studies (M.M.E.), 1992, 2001 – 2005, 2007 – 2008
Computing (M.M.E.), 1993 – 2001, (Chairman, 1999 – 2000)
Curriculum Assessment (Mech Engr.), 1999 – 2002
Library Liaison (M.M.E.), 1986 – Present

**INDUSTRIAL
EXPERIENCE**

1977 – 1978 **Technical Manager**
Cruise Missile Route Optimization

Specialist in Optimization
Optimal Ship Attack Maneuvers
Infrared Signature Modelling

Cruise Missile Operations Analysis Branch
Convair Research & Development Division
General Dynamics
San Diego, California

1973 – 1977 **Assistant Manager**, Software Design & Development

TRW San Diego
Anti-Submarine Command & Control Software

Staff Research Engineer
Energy Systems Analysis and Optimization
Ballistic Missile Tracking Software

TRW Defense and Space Systems
Redondo Beach, California

1965 – 1968 **Research Engineer**
Optimal Flow Rates for Oilwell Drilling

 Dresser Industries
Oilfield and Mining Equipment Division
Dallas, Texas

PUBLICATIONS

BOOKS

Optimization and Games with Numerical Methods

Grantham, W. J., (in preparation).

Nonlinear and Optimal Control Systems

Vincent, T. L. and Grantham, W. J., John Wiley & Sons, New York, 1997.

Modern Control Systems Analysis and Design

Grantham, W. J. and Vincent, T. L., John Wiley & Sons, New York, 1993.

Sistemas de Control Moderno, Analisis y Diseno

Grantham, W. J. and Vincent, T. L., Limusa, Mexico, 1998.

Optimality in Parametric Systems

Vincent, T. L. and Grantham, W. J., John Wiley & Sons, New York, 1981.

CHAPTERS IN BOOKS

Grantham, W. J., "Gradient Transformation Trajectory Following Algorithms for Determining Stationary Min-Max Saddle Points," in *Advances in Dynamic Game Theory*, Jørgensen, S. J., Quincampoix, M., and Vincent, T. L., eds., Birkhäuser, Boston, 2007, pp. 639 – 657.

McDonald, D. B. and Grantham, W. J., "Singular Perturbation Trajectory Following Algorithms for Min-Max Differential Games," in *Advances in Dynamic Game Theory*, Jørgensen, S. J., Quincampoix, M., and Vincent, T. L., eds., Birkhäuser, Boston, 2007, pp. 659 – 678. (Best Paper, 11th Int'l. Symposium on Dynamic Games and Applications, Tucson, AZ, Dec. 2004).

Schimmel, B. D. and Grantham, W. J., "State Space Models," *The Engineering Handbook*, R.C. Dorf, ed., CRC Press, Boca Raton, FL, 1995, pp. 1058 – 1069.

Grantham, W. J. and Athalye, A. M., "Discretization Chaos: Feedback Control and Transition to Chaos", in *Control and Dynamic Systems*, Vol. 34, Part 1 of 2, C.T. Leondes, ed., Academic Press, San Diego, 1990, pp. 205 – 277.

Grantham, W. J. and Athalye, A. M., "A Chaotic System: Discretization and Control," in *Dynamics of Complex Interconnected Biological Systems*, Mees, A.I. and Vincent, T.L., eds., Birkhäuser, Boston, 1990, pp. 155 – 174.

Grantham, W. J. and Fisher, M. E., "Generating Reachable Set Boundaries for Discrete-Time Systems", in *Modeling and Management of Resources Under Uncertainty*, Vincent, T.L., Cohen, Y., Grantham, W.J., Kirkwood, G. P., and Skowronski, J. M., eds., Springer-Verlag, New York, 1987, pp. 152 – 166.

Grantham, W. J., "Estimating Controllability Boundaries for Uncertain Systems," in *Renewable Resource Management*, T. L. Vincent and J. M. Skowronski, eds., Springer-Verlag, New York, 1981, pp. 151 – 162.

INVITED PAPERS

"Gradient Transformation Trajectory Following Algorithms for Equality-Constrained Minimization," *Nonlinear Dynamics and System Theory* (in review).

"Notch Filter Control for k-Period Motion in a Chaotic System," N.S.F./Australia Workshop on Control and Chaos, Honolulu, HI, June 29 – July 1, 1995

"Notch Filter Feedback Control of a Chaotic System," American Control Conference, Seattle, WA, June 21 – 23, 1995

"State Space Models," *The Engineering Handbook*, CRC Press, Boca Raton, FL, 1995

"Chaos Suppression via Notch Filter Feedback Control," World Congress of Nonlinear Analysts, Tampa, FL, Aug. 19 – 26, 1992

INVITED PAPERS (Continued)

“Optimal Control of a Chaotic System”

5th Control Mechanics Workshop, Univ. of Southern Calif., Los Angeles, CA, Jan. 22 – 24, 1992
University of Canterbury, Canterbury, New Zealand, Nov., 1991
Central College of Queensland, Rockhampton, Queensland, Australia, Nov., 1991
University of Queensland, Brisbane, Queensland, Australia, Nov., 1991
Royal Melbourne Institute of Technology, Melbourne, Victoria, Australia, Nov. 1991
Defence Science and Technology Office, Adelaide, South Australia, Oct. 1991
University of Western Australia, Perth, Western Australia, July, 1991.

“Chaos in Notch Filter Feedback Control of a Duffing Oscillator”

4th Control Mechanics Workshop, Univ. of Southern Calif., Los Angeles, CA, Jan. 22 – 24, 1991

“A DFW Microburst Model Based on DL-191 Data”

29th I.E.E.E. Conf. on Decision and Control, Honolulu, HI, Dec. 5 – 7, 1990.

“An Optimal Control Paradox: Maximum Chaos Yields a Limit Cycle”

3rd Control Mechanics Workshop, Univ. of Southern Calif., Los Angeles, CA, Jan. 22 – 24, 1990

“Discretization Chaos: Feedback Control and Transition to Chaos”

N.S.F. Control Mechanics Workshop, Univ. of Southern Calif., Los Angeles, CA, Jan. 23 – 25, 1989

“A Chaotic System: Discretization and Control”

N.S.F./Australia Workshop on the Dynamics of Complex Interconnected Biological Systems,
Albany, Western Australia, Jan. 2 – 5, 1989

“Aero-Assisted Orbital Maneuvering Using Lyapunov Optimal Feedback Control”

A.I.A.A. Guidance, Navigation, and Control Conf., Monterey, CA, Aug. 1987

“Optimal Descent Games for Resource Management”

1986 Int’l Federation on Automatic Control
Workshop on Modelling, Decisions, and Games:
With Applications to Social Phenomena,
Beijing, Peoples Republic of China, Aug. 1986.

“Constructing Reachable Sets for Discrete-Time Systems”

Second Int’l Conf. on Renewable Resource Management
National Science Foundation US-Australia Program
Honolulu, HI, Dec. 1985

15th Modelling and Simulation Conference
University of Pittsburgh, April 1984

“Estimating Controllability Boundaries”

First Int’l Conf. on Renewable Resource Management
National Science Foundation US-Australia-New Zealand Program
University of Canterbury, Christchurch, New Zealand, Jan. 1981

ASME 1980 Winter Annual Meeting, Chicago, Nov. 1980

REFEREED PAPERS

Grantham, W. J., “Gradient Transformation Trajectory Following Algorithms for Equality-Constrained Minimization,” *Nonlinear Dynamics and System Theory* (in review).

McDonald, D. B., Grantham, W. J., Tabor, W. L. and Murphy, M. J., “Global and Local Optimization Using Radial Basis Function Response Surface Models,” *Applied Mathematical Modelling*, Vol. 31, No. 10, Oct. 2007, pp. 2095 – 2110.

REFEREED PAPERS (Continued)

- Grantham, W. J., "Gradient Transformation Trajectory Following Algorithms for Determining Stationary Min-Max Saddle Points," in *Advances in Dynamic Game Theory*, Jørgensen, S. J., Quincampoix, M., and Vincent, T. L., eds., Birkhäuser, Boston, 2007, pp. 639 – 657.
- McDonald, D. B. and Grantham, W. J., "Singular Perturbation Trajectory Following Algorithms for Min-Max Differential Games," in *Advances in Dynamic Game Theory*, Jørgensen, S. J., Quincampoix, M., and Vincent, T. L., eds., Birkhäuser, Boston, 2007, pp. 659 – 678. (Best Paper, 11th Int'l. Symposium on Dynamic Games and Applications, Tucson, AZ, Dec. 2004).
- Grantham, W. J., "Trajectory Following Optimization by Gradient Transformation Differential Equations," *Proc. 42nd I.E.E.E. Conf. on Decision and Control*, Maui, HI, Dec. 9 – 12, 2003, pp. 5496 – 5501.
- Vincent, T. L. and Grantham, W. J., "Trajectory Following Methods in Control System Design," *J. of Global Optimization*, Vol. 23, No. 3 – 4, Aug. 2002, pp. 267–282.
- Schimmel, B. D., Baker, E. L., and Grantham, W. J., "A Method for Parameter Optimization of Reactive Flow Continuum Models by Sequential Quadratic Programming," *J. of Energetic Materials*, Vol. 15, No. 4, 1997, pp. 289 – 311.
- Grantham, W. J., and Athalye, A. M., "Notch Filter Control for k-Period Motion in a Chaotic System," *Control and Chaos*, K. Judd, A. I. Mees, K. L. Teo, T. L. Vincent, eds., Birkhauser, Boston, 1997, pp. 142 – 155.
- Schimmel, B. D., and Grantham, W. J., "State Space Models," *The Engineering Handbook*, R.C. Dorf, ed., CRC Press, Boca Raton, FL, 1995, pp. 1058 – 1069.
- Fisher, M. E., Grantham, W. J., and Teo, K. L., "Neighbouring Extremals for Nonlinear Systems with Control Constraints," *Dynamics and Control*, Vol. 5, No. 3, July 1995, pp. 225 – 240.
- Lee, B., Grantham, W. J., and Fisher, M. E., "Differential Equation for Continuous Normalization," *KSME Journal*, Vol. 8, No. 1, 1994, pp. 63 – 68.
- Grantham, W. J. and Lee, B., "A Chaotic Limit Cycle Paradox," *Dynamics and Control*, Vol. 3, No. 2, April 1993, pp. 157 – 171.
- Grantham, W. J. and Parks, E. K., "A DFW Microburst Model Based on DL-191 Data," *Proc. 29th I.E.E.E. Conf. on Decision and Control*, Vol. 2 of 6, Dec. 1990, pp. 695 – 701.
- Grantham, W. J., Roetcisoender, G. G., and Parks, E.K., "DFW Microburst Model Based on AA - 539 Data," *J. of Aircraft*, Vol. 27, No. 11, Nov. 1990, pp. 917 – 922.
- Grantham, W. J. and Athalye, A. M., "Discretization Chaos: Feedback Control and Transition to Chaos", in *Control and Dynamic Systems*, Vol. 34, Part 1 of 2, C.T. Leondes, ed., Academic Press, San Diego, 1990, pp. 205 – 277.
- Grantham, W. J. and Athalye, A. M., "A Chaotic System: Discretization and Control," in *Dynamics of Complex Interconnected Biological Systems*, Mees, A.I. and Vincent, T.L., eds., Birkhäuser, Boston, 1990, pp. 155 – 174.
- Anderson, M. J. and Grantham, W. J., "Lyapunov Optimal Feedback Control of an Inverted Pendulum," *J. Dynamic Systems, Measurement and Control*, Vol. 111, No. 4, Dec. 1989, pp. 554 – 558.
- Lee, B. S. and Grantham, W. J., "Aero-Assisted Orbital Maneuvering Using Lyapunov Optimal Feedback Control," *J. Guidance, Control, and Dynamics*, Vol. 12, No. 2, March–April 1989, pp. 237 – 242.
- Grantham, W. J. and Fisher, M. E., "Generating Reachable Set Boundaries for Discrete-Time Systems", in *Modeling and Management of Resources Under Uncertainty*, Vincent, T.L., Cohen, Y., Grantham, W.J., Kirkwood, G. P., and Skowronski, J. M., eds., Springer-Verlag, New York, 1987.
- Baker, E. L. and Grantham, W. J., "Dynamics of Coal Dust Flame Acceleration: A Feedback Control Model for Unsteady Flow," *Mathematical Modelling*, Vol. 8, 1987. (Richard Bellman Award: Best Paper, 5th Int'l Conf. on Math. Modelling).
- Fritchman, B. M. and Grantham, W. J., "Differential Game Control of a Bilinear Solar Collector/Heat Exchanger System," *Mathematical Modelling*, Vol. 8, 1987.
- Fisher, M. E. and Grantham, W. J., "Estimating the Effect of Continual Disturbances on Discrete-Time Population Models," *J. of Mathematical Biology*, Vol. 22, 1985.
- Grantham, W. J. and Chingcuanco, A. O., "Lyapunov Steepest Descent Control of Constrained Linear Systems," *I.E.E.E. Trans. on Automatic Control*, Vol. AC-29, No. 8, Aug. 1984, pp. 740 – 743.
- Grantham, W. J., "Some Necessary Conditions for Steepest Descent Controllability," *Proc. American Controls Conf.*, Alexandria, VA, June 1982.
- Fritchman, B. M. and Grantham, W. J., "Optimal Control of a Bilinear Solar Collector/Heat Exchanger System," *Proc. American Controls Conf.*, Alexandria, VA, June 1982.
- Grantham, W. J., "Estimating Controllability Boundaries for Uncertain Systems," in *Renewable Resource Management*, T. L. Vincent and J. M. Skowronski, eds., Springer-Verlag, New York, 1981, pp 151 – 162.
- Grantham, W. J., "Controllability Conditions and Effective Controls for Nonlinear Systems," *Proc. 20th I.E.E.E. Conf. on Decision and Control*, San Diego, CA, Dec. 1981.
- Grantham, W. J., "Estimating Reachable Sets," *J. of Dynamic Systems, Measurement and Control*, Vol. 103, No. 4, Dec. 1981.
- Grantham, W. J., "Lyapunov-Stackelberg Estimates for Reachable Sets," *Proc. 19th I.E.E.E. Conf. on Decision and Control*, Albuquerque, NM, Dec. 1980.

REFEREED PAPERS (Continued)

- Grantham, W. J. and Vincent, T. L., "A Controllability Minimum Principle," *J. of Optimization Theory and Applications*, Vol. 17, Nos. 1/2, Oct. 1975.
- Vincent, T. L., Cliff, E. M., Grantham, W. J., and Peng, W. Y., "Some Aspects of Collision Avoidance," *A.I.A.A. J.*, Vol. 12, No. 1, Jan. 1974.

OTHER PAPERS

- McDonald, D. B. and Grantham, W. J., "Lyapunov Optimizing Control with Trajectory Following Minimization: Analysis and Application in the Optimal Control Setting," *S.I.A.M. Annual Meeting*, Boston, MA, July 2006.
- Grantham, W. J., "Gradient Transformation Trajectory Following Algorithms for Determining Stationary Min-Max Saddle Points," *Proc. 11th Int'l. Symposium on Dynamic Games and Applications*, Tucson, AZ, Dec. 2004, pp. 320 – 338.
- McDonald, D. B., Grantham, W. J., Tabor, W. L., and Murphy, M. J., "Response Surface Model Development for Global/Local Optimization Using Radial Basis Functions," *Proc. 8th A.I.A.A. Symposium on Multidisciplinary Analysis and Optimization*, Long Beach, CA, Sept. 2000.
- Baker, E. L., Schimel, B. D., and Grantham, W. J., "Numerical Optimization of Ignition and Growth Reactive Flow Modeling for PAX2A," *APS Topical Conf. on Shock Compression of Condensed Matter*, Seattle, WA, Aug. 13 – 18, 1995.
- Athalye, A. M., and Grantham, W. J., "Notch Filter Feedback Control of a Chaotic System," *Proc. Amer. Control Conf.*, Seattle, WA, June 1995.
- Skowronski, J. M., Lee, B. S., and Grantham, W. J., "Chaos in a Dynamic Game", *Proc. A.I.A.A. Guidance, Navigation and Control Conf.*, Boston, MA, Aug. 1989.
- Lee, B.S. and Grantham, W.J., "Aero-Assisted Orbital Transfer in an Uncertain Atmosphere," *Proc. A.I.A.A. Guidance, Navigation and Control Conf.*, Minniapolis, MN, Aug. 1988.
- Grantham, W. J. and Parks, E. K., "The DFW Microburst: A Two-Dimensional Multiple Vortex Model," *A.I.A.A. 26th Aerospace Sciences Conf.*, Reno, NV, Jan. 11 – 14, 1987
- Grantham, W. J., "ODESSYS: Ordinary Differential Equations Simulation System for Nonlinear Optimization, Controls, and Differential Games," *Proc. 3rd I.E.E.E. Conf. on Computer-Aided Control Systems Design*, Arlington, VA, Sept. 1986.
- Zalesinski, M., Baker, E., Grantham, W., and Wojcicki, S., "A Control System Model for Coal Dust Flame Acceleration," 1984 Spring Meeting, Western States Section/The Combustion Institute, Boulder, CO, April 1984
- Grantham, W. J. and Wojcicki, S., "Dynamics of a Turbo-Charged Fluidized Bed Combustion System," 1982 Spring Meeting, Western States Section/The Combustion Institute, Salt Lake City, UT, April 1982.
- Grantham, W. J. and Bruschi, R. G., "Optimal Cruise Missile Maneuvers Against a Continuously Firing Gun," *Proc. 40th Military Operations Research Symposium*, Monterey, CA, Dec. 1977. (*Best Paper, Air Defense Group*)
- Grantham, W. J., "A Lagrangian Controller for Large-Scale Vector-Valued Systems," *Proc. 10th Int'l. Conf. on Systems Sciences*, Honolulu, HI, Jan. 1977.
- Vincent, T. L., Cliff, E. M., Grantham, W. J., and Peng, W. Y., "Aircraft Collision Avoidance," *Proc. Navy Summer Workshop on Differential Games*, Annapolis, MD, Aug. 1973.
- Vincent, T. L. and Grantham, W. J., "Optimal Control of the Spread of a Contagious Disease," *Proc. 6th Int'l Conf. on Systems Sciences*, Honolulu, HI, Jan. 1973.
- Grantham, W. J., Cliff, E. M., and Vincent, T.L., "On Barriers in a Problem of Collision Avoidance," *Proc. 4th Int'l Conf. on Systems Sciences*, Honolulu, HI, Jan. 1971.

REPORTS

- Schimel, B.D., Ding, J.L., Anderson, M.D., and Grantham, W.J., *ME349 Dynamic Systems Laboratory Manual*, Washington State University, Pullman, WA, 1997.
- Schimel, B. D., Grantham, W. J., Anderson, M. J. and Ding, J-L, *ME 349 Dynamic Systems Laboratory Manual*, School of Mechanical and Materials Engineering, Washington State University, Aug. 1995.
- Grantham, W. J. and Bruschi, R. G., *Terminal Maneuvers Against an Open-Loop Gun*, Convair/GD Report CASD-ERR-78-017, Aug. 1978.
- Grantham, W. J. and Purdy, F. W., *Infrared Signature Models for Advanced Cruise Missiles*, Convair/GD Report CASD-ERR-77-049, Dec. 1977.
- Grantham, W. J., *A Controllability Minimum Principle*, Ph.D. Dissertation, The University of Arizona, May 1973.
- Vincent, T. L., Cliff, E. M., Grantham, W. J., and Peng, W. Y., *A Problem of Collision Avoidance*, University of Arizona Engineering Experiment Station Report No. 39, Nov. 1972.