

## Malcolm D. Shuster

### Selected Publications in Astronautics\*

- [1] "Three-Axis Attitude Determination from Vector Observations," M. D. Shuster and S. D. Oh, *Journal of Guidance and Control*, Vol. 4, No. 1, January–February 1981, pp. 70–77.
- [2] "Inflight Magnetometer Calibration and Attitude Determination for Near-Earth Spacecraft," G. M. Lerner and M. D. Shuster, *Journal of Guidance and Control*, Vol. 4, No. 5, September–October 1981, pp. 518–522.
- [3] "Inflight Estimation of Spacecraft Attitude-Sensor Accuracy and Alignments," M. D. Shuster, D. M. Chitre, and D. P. Niebur, *Journal of Guidance, Control and Dynamics*, Vol. 5, No. 4, July–August 1982, pp. 339–343.\*\*
- [4] "Kalman Filtering for Spacecraft Attitude Estimation" (survey paper), E. J. Lefferts, F. L. Markley, and M. D. Shuster, *Journal of Guidance, Control and Dynamics*, Vol. 5, No. 5, September–October 1982, pp. 417–429.
- [5] "Efficient Algorithms for Spin-Axis Attitude Estimation," M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 31, No. 2, April–June 1983, pp. 237–249; Errata: Vol. 51, No. 1, January–March 2003, p. 121.
- [6] "Maximum Likelihood Estimation of Spacecraft Attitude," M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 37, No. 1, January–March, 1989, pp. 79–88.
- [7] "A Simple Kalman Filter and Smoother for Spacecraft Attitude," M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 37, No. 1, January–March, 1989, pp. 89–106.
- [8] "Kalman Filtering of Spacecraft Attitude and the QUEST Model," M. D. Shuster, *Journal of the Astronautical Sciences* Vol. 38, No. 3, July–September, 1990, pp. 377–393; Erratum: Vol. 51, No. 3, July–September 2003, p. 359.
- [9] "Batch Estimation of Spacecraft Sensor Alignments, I. Relative Alignment Estimation," M. D. Shuster, D. S. Pitone, and G. J. Bierman *Journal of the Astronautical Sciences*, Vol. 39, No. 4, October–December, 1991, pp. 519–546.
- [10] "Batch Estimation of Spacecraft Sensor Alignments, II. Absolute Alignment Estimation," M. D. Shuster and D. S. Pitone, *Journal of the Astronautical Sciences*, Vol. 39, No. 4, October–December, 1991, pp. 547–571.
- [11] "Attitude Determination in Higher Dimensions" (Engineering Note), M. D. Shuster, *Journal of Guidance, Control and Dynamics*, Vol. 16, No. 2, March–April 1993, pp. 393–395.
- [12] "A Survey of Attitude Representations," M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 41, No. 4, October–December 1993, pp. 439–517.
- [13] "The Geometry of the Euler Angles," J. L. Junkins and M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 41, No. 4, October–December 1993, pp. 531–543.
- [14] "Quaternion Computation from a Geometric Point of View," M. D. Shuster and G. A. Natanson, *Journal of the Astronautical Sciences*, Vol. 41, No. 4, October–December 1993, pp. 545–556.

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\*This list consists of about 2/3 of the author's archival publications which he feels have been the most useful to astronautics. Items marked with an asterisk are recently accepted for publication or in press. 15 May 05

\*\*The portion of this paper on alignment estimation was very primitive and superceded by items 9 and 10. The material on accuracy estimation requires no modification and is still worth knowing.

- [ 15 ] "Spacecraft Attitude Determination and Control," M. D. Shuster, Chapter 5 in V. L. Pisacane and R. C. Moore (eds.), *Fundamentals of Space Systems*, Oxford University Press, ISBN 0-19-507497-1, 1994, pp. 245–336; second edition (with W. Dellinger) in V. L. Pisacane (ed.), *Fundamentals of Space Systems*, Oxford University Press, ISBN 0-19-516205-6, 2005, pp. 236–325 (in press).
- [ 16 ] "Focal-Plane Representation of Rotations," M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 48, Nos. 2 and 3, April–September 2000, pp. 381–390.
- [ 17 ] "TWOSTEP, a Fast Robust Algorithm for Attitude-Independent Magnetometer Bias Determination," R. Alonso and M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 50, No. 4, October–December 2002, pp. 433–451.
- [ 18 ] "Attitude-Independent Magnetometer Bias Determination," A Survey, R. Alonso and M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 50, No. 4, October–December 2002, pp. 453–475.
- [ 19 ] "Complete Linear Attitude-Independent Magnetometer Calibration," R. Alonso and M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 50, No. 4, October–December 2002, pp. 477–490.
- [ 20 ] "Constraint in Attitude Estimation Part I: Constrained Estimation," M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 51, No. 1, January–March 2003, pp. 51–74.
- [ 21 ] "Constraint in Attitude Estimation Part II: Unconstrained Estimation," M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 51, No. 1, January–March 2003, pp. 75–101.
- [ 22 ] "Generalization of the Euler Angles," M. D. Shuster and F. L. Markley, *Journal of the Astronautical Sciences*, Vol. 51, No. 2, April–June 2003, pp. 123–132.
- [ 23 ] "Parameter Interference in Distortion and Alignment Calibration," R. V. F. Lopes and M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 51, No. 3, July–September 2003, pp. 261–277.
- [ 24 ] "Batch, Sequential and Hybrid Approaches to Spacecraft Sensor Alignment Estimation," *Journal of the Astronautical Sciences*, Vol. 51, No. 3, July–September 2003, pp. 279–290.
- [ 25 ] "Uniform Attitude Probability Distributions," M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 51, No. 4, October–December 2003, pp. 451–475.
- [ 26 ] "Stellar Aberration and Parallax: A Tutorial," M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 51, No. 4, October–December 2003, pp. 477–494.
- [ 27 ] "Attitude Analysis in Flatland: The Plane Truth," M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 52, Nos. 1 and 2, January–June 2004, pp. 195–209.
- [ 28 ] "SCAD—A Fast Algorithm for Star Camera Attitude Determination," M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 52, No. 3, July–September 2004, 13 pp.
- [ 29 ] "Deterministic Three-Axis Attitude Determination," M. D. Shuster, *Journal of the Astronautical Sciences*, Vol. 52, No. 3, July–September 2004\*, 15 pp.
- [ \*30 ] "QUEST and the Anti-QUEST : Good and Evil Attitude Estimation," Y. Cheng and M. D. Shuster, to appear in the *Journal of the Astronautical Sciences*,  $\approx$  18 pp.
- [ \*31 ] "Fusion of Attitude Data, the Equivalent-Vector Method and the Generalized Wahba Problem," M. D. Shuster, to appear in the *Journal of the Astronautical Sciences*,  $\approx$  20 pp.
- [ \*32 ] "Efficient Algorithms for Spin-Axis Attitude Estimation II," M. D. Shuster, to appear in the *Journal of the Astronautical Sciences*  $\approx$  17 pp.
- [ \*33 ] "The TRIAD Algorithm as Maximum-Likelihood Estimation," M. D. Shuster, to appear in the *Journal of the Astronautical Sciences*  $\approx$  10 pp.