

2007f

“The Optimization of TRIAD,” Malcolm D. Shuster, *The Journal of the Astronautical Sciences*, Vol. 55, No. 2, April–June 2007, pp. 245–257.

This work began as a covariance analysis of the “optimal TRIAD” algorithm of Bar-Itzhack and Harman. To my surprise the covariance matrix of the “optimal TRIAD” algorithm, if the orthogonalization of the attitude is carried out completely, turned out to good approximation to be the QUEST covariance matrix. A more careful error analysis showed that the optimal TRIAD algorithm was identical to the QUEST algorithm within terms of second order in the measurement noise. This was not expected, because the effective assumptions of the authors on the nature of the estimate errors in the TRIAD were almost opposite to the actual case. This paper is most interesting, perhaps, for its error analysis of the TRIAD algorithm.

I later discovered that Markley had derived a more exact relationship between the “optimal TRIAD” algorithm and the exact solution to the Wahba problem. Markley’s result also provides the simplest manner for orthogonalizing the “optimal TRIAD” solution. These results are also presented.

(027x)