

1992a

“Attitude Analysis in Flatland: The Plane Truth,” M. D. Shuster, *Proceedings, Flight Mechanics/Estimation Theory Symposium*, NASA Goddard Space Flight Center, Greenbelt, Maryland, May 5–7, 1992, pp. 259–274.

This work examined two-dimensional analogues of the attitude representations and attitude estimation algorithms. It has been superseded by the journal article. The contents of the two works are not identical. 1992a takes as its example the two-dimensional analogue of the Bar-Itzhack-Oshman unconstrained quaternion Kalman filter, and showed that if the norm constraint is restored correctly, the result must be the same as that of the (less burdensome computationally) “multiplicative” Kalman filter for attitude. This article was the first to make clear the ludicrousness of the Bar-Itzhack-Oshman unconstrained quaternion Kalman filter, because it showed that the most efficient way to restore the norm constraint to the Bar-Itzhack-Oshman result was to discard it and start over from the beginning with a correctly constrained quaternion Kalman filter in the manner of 1982c.

Bar-Itzhack and Oshman call their unconstrained Kalman filter the AEKF (additive extended Kalman filter) and contrasts it with the MEKF (multiplicative EKF) of 1982c. That nomenclature is misleading since 1982c describes also an implementation of the AEKF for the quaternion which is properly constrained. Thus it would be more correct to call the Bar-Itzhack-Oshman filter the “unconstrained AEKF” so as to better distinguish it from correctly constrained AEKF’s.

That result has been treated in much greater detail and with much more rigor in 2003a and 2003b. The journal publication of the present article, 2004a, therefore, took for its example the two-dimensional analogue of the OLAE algorithm of my friends Mortari, Junkins and Markley, whom I lampooned with great gusto (but with mathematical rigor).

Superseded by 2004a but with a different example.