A SURVEY OF METHODS FOR COMPUTING BEST ESTIMATES OF ENDOATMOSPHERIC AND EXOATMOSPHERIC TRAJECTORIES

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ABSTRACT

Beginning with the mathematical prediction of planetary orbits in the early seventeenth century up through the most recent developments in sensor fusion methods, many techniques have emerged that can be employed on the problem of endo and exoatmospheric trajectory estimation. Although early methods were *ad hoc*, the twentieth century saw the emergence of many systematic approaches to estimation theory that produced a wealth of useful techniques. The broad genesis of estimation theory has resulted in an equally broad array of mathematical principles, methods and vocabulary. Among the fundamental ideas and methods that are briefly touched on are batch and sequential processing, smoothing, estimation, and prediction, sensor fusion, sensor fusion architectures, data association, Bayesian and non Bayesian filtering, the family of Kalman filters, models of the dynamics of the phases of a rocket's flight, and asynchronous, delayed, and asequent data. Along the way, a few trajectory estimation issues are addressed and much of the vocabulary is defined.