Analytical Partial Derivatives of Observation Matrix

M.P. Pinheiro

Analytical expressions are obtained for the partial derivatives of a set of observations with respect to a given state vector. Such equations are often needed in orbit determinations methods. The equations presented in this paper can be applied to low and high satellite orbits. Position, velocity, thruster and solar radiation force are the components of the state vector. The observation vector is composed by azimuth, elevation, range, azimuth and elevation biases. From the orbit determination accuracy point of view, the biases may not be considered for geostationary orbits; however they are important during transfer phase and for low orbit satellites