

A New Method for Orbit Design of Satellite Constellations

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Many studies have been performed to design satellite constellations for continuous global coverage of the Earth by many satellites. The results are useful for satellite communication and navigation systems. A new efficient method for optimal constellation configuration is presented in this paper. The method combines a minimization technique with a new algorithm for coverage calculation. Input parameters are total number of satellites, altitude, minimum elevation mask, and latitude boundary to be covered. This method can yield optimal constellations for maximum coverage with the given parameters. Examples demonstrate optimal coverages for various constellations, by using the method developed. The Satellite Tool Kit's coverage module was used to prove the results.