



Towards Mars reference equipotential surface, reference ellipsoid and ellipsoidal harmonic coefficients

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Taking advantage of the publicly available “Mars Orbit Laser Altimeter (MOLA)” as well as the gravitational field model of the Mars in terms of spherical harmonics (GMM2B) complete to degree and order 80, the reference equipotential surface of the Mars (areoid) has been computed as an equipotential surface which best fits to the Mars’s topography in least squares sense. Having computed the potential and geometry of the areoid, four fundamental parameters of the Mars $\{W_0, J_2, GM, \omega\}$, i.e. {areoid’s potential, second zonal coefficient of the spherical harmonic expansion, gravitational constant, angular velocity}, are used to compute a Somigliana-Pizzetti type reference ellipsoid for the Mars. Finally, the spherical harmonic coefficients, GMM2B, are transferred into the ellipsoidal harmonics coefficients with respect to the computed reference ellipsoid.