ON A NEW ANALYTIC THEORY OF THE MOON'S MOTION II: ORBIT AND LENGTH OF MONTHS

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Abstract.   The differential equation in polar coordinates of the Moon's orbit is outlined from the first-order approximation to the Lagrange equations of the Sun-Earth-Moon system expressed with relative coordinates and accelerations. The orbit of the Moon calculated this way is similar to Clairaut's modified orbit and has better parameters than those previously published. An improvement to this orbit is proposed based on theoretical arguments. With help of this new orbit, the variations in the draconic, synodic and anomalistic months are also computed showing very good agreement with observations.

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