Varia – Miscellaneous – Divers

Corrections to: Constrained normalization of Hamiltonian systems and perturbed Keplerian motion (Z. angew. Math. Phys. Vol. *37*, 402–424, 1986). By Jan-Cees van der Meer, Center for Mathematics and Computer Science (CWI), Kruislaan 413, 1098 SJ Amsterdam, and Richard Cushman, Mathematics Institute, Rijksuniversiteit Utrecht, Budapestlaan 6, 3584 CD Utrecht, The Netherlands.

Unfortunately the normal form for the lunar problem as stated in the above mentioned paper is wrong. The actual mistake is in formula (28). This also influences formulas (37) and (41). The correct formulas are

$$H^\lambda(q,p) = |p| - \lambda\left(\frac{1}{k}|p|(1 - q_4)(q_1 p_2 - q_2 p_1)\right)$$

$$- \lambda^2 \frac{1}{2}\frac{(1 - \nu)}{k^3}|p|\left(3 p_1^2 + 6(q_1 p_4 - q_4 p_1)p_1 + 3(q_1 p_4 - q_4 p_1)^2\right.$$

$$- |p|^2 + 3|p|^2 q_4 - 3|p|^2 q_4^2 - 3 q_4 p_1^2 - 6(q_1 p_4 - q_4 p_1)q_4 p_1$$

$$\left. - 3(q_1 p_4 - q_4 p_1)^2 q_4 + |p|^2 q_4^3\right), \tag{28}$$

$$\overline{H}_2(q,p) = -\frac{3}{2}\frac{(1-\nu)}{k^3}BS_{14}^2 + \frac{1}{2}\frac{(1-\nu)}{k^3}B^3 + \frac{3}{4}\frac{(1-\nu)}{k^3}B^3 Q_4^2 + \frac{3}{4}\frac{(1-\nu)}{k^3}B^3 q_4^2$$

$$- \frac{3}{2}\frac{(1-\nu)}{k^3}BS_{14}Q_4 P_1 + \frac{3}{2}\frac{(1-\nu)}{k^3}BS_{14}q_4 p_1 - \frac{3}{4}\frac{(1-\nu)}{k^3}BP_1^2$$

$$- \frac{3}{4}\frac{(1-\nu)}{k^3}Bp_1^2, \tag{37}$$

$$\widetilde{\overline{H}}_2(q,p)\,|\,T^+S^3 = -3\frac{(1-\nu)}{k^3}|p|S_{14}^2 + \frac{1}{2}\frac{(1-\nu)}{k^3}|p|^3 + \frac{3}{4}\frac{(1-\nu)}{k^3}|p|(|p|^2 q_4^2 + p_4^2)$$

$$- \frac{3}{4}\frac{(1-\nu)}{k^3}|p|(|p|^2 q_1^2 + p_1^2) + \frac{1}{4k^2}|p|S_{12}^2$$

$$- \frac{1}{8k^2}\left(\frac{1}{2} + \frac{1}{|p|}\right)S_{12}^2(|p|^2 q_4^2 + p_4^2). \tag{41}$$