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Corrigendum

Corrigendum to “Interpreting the librations of a synchronous satellite – How their phase assesses Mimas’ global ocean” [Icarus 282 (2017) 276–289]

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Abstract

A mistake appeared in the original paper, which propagated. This affects the phase of the diurnal libration. The conclusions are unchanged.

Keywords

Resonances; Spin-orbit – Rotational dynamics – Satellites; Shapes – Celestial mechanics – Saturn; Satellites.

An error appeared in the derivation of a formula, which propagated and altered the expression for the diurnal and semi-diurnal librations. The formulae and figures associated are to be replaced by the following ones. The conclusions of the paper are unchanged.

In Section 4, the Eq. (35) should now read

$$\Gamma = \left(\frac{2}{5}MR^2 + \frac{M_\mathfrak{h}R^5}{a^3}\left(k_f\left(\frac{5}{9}+\frac{1}{2}e^2\right) + ek_2(\nu_1)\cos\mathcal{M} + \frac{3}{2}e^2k_2(\nu_2)\cos 2\mathcal{M}\right)\right)\ddot{\sigma}$$
$$-\frac{M_\mathfrak{h}R^5}{a^3}(n-\dot{\varpi})\left(k_2(\nu_1)e\sin\mathcal{M} + 3k_2(\nu_2)e^2\sin 2\mathcal{M}\right)(n+\dot{\sigma}), \quad (1)$$

which gives (Eq. (41) and (42))

$$K_5 = 6en^2\frac{M_\mathfrak{h}R^5}{a^3}\left(k_f - \frac{5}{6}k_2(\nu_1)\right), \quad (2)$$

$$K_6 = \frac{51}{4}e^2n^2\frac{M_\mathfrak{h}R^5}{a^3}\left(k_f - \frac{13}{17}k_2(\nu_2)\right), \quad (3)$$

and (Eq. (50))

$$\kappa_1 = 6en^2\frac{(I_{22}-I_{11})^{(f)} + M_\mathfrak{h}\frac{R^5}{a^3}\left(k_f - \frac{5}{6}k_2(\nu_1)\right)}{\frac{2}{5}MR^2 + k_f\left(\frac{5}{9}+\frac{e^2}{2}\right)M_\mathfrak{h}\frac{R^5}{a^3}}, \quad (4)$$

and the new Table 4 (See Table 1):

In the Section 7.1, the Eq. (79) becomes

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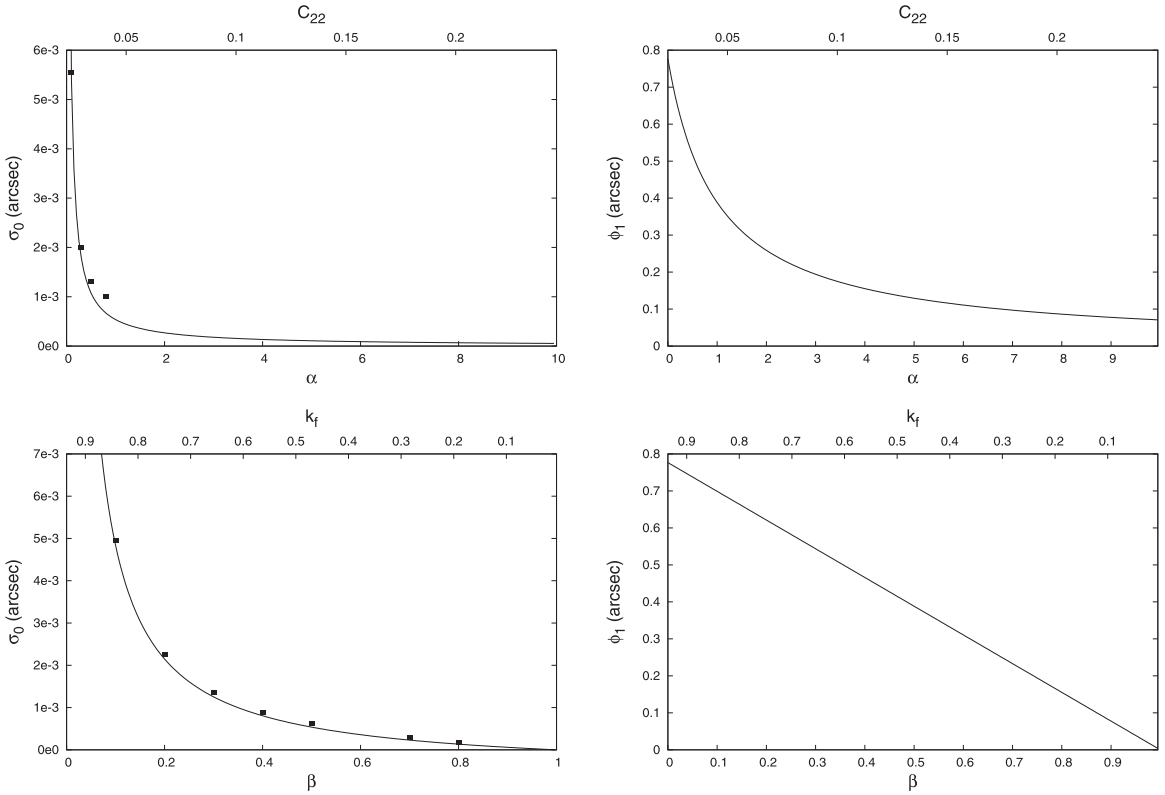

Fig. 1. (Figure 8) Rotational quantities for Epimetheus in the dissipative case, for $k_f = 1.5$ (top), and $C_{22} = 1.426 \times 10^{-2}$ (down). The lines come from the analytical formulae, while the squares result from numerical simulations.

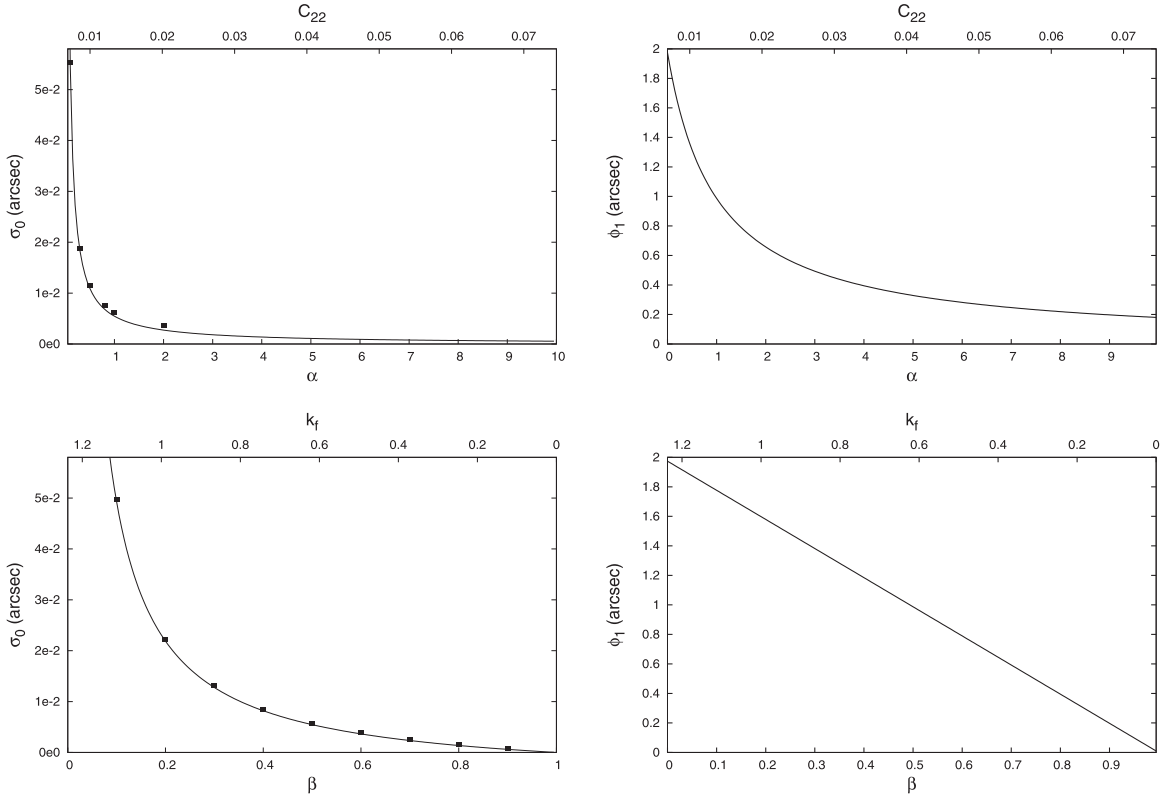

Fig. 2. (Figure 9) Rotational quantities for Mimas in the dissipative case, for $k_f = 1.5$ (top), and $C_{22} = 5.606 \times 10^{-3}$ (down). The lines come from the analytical formulae, while the squares result from numerical simulations.