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CORRECTION

Correction to: Representation of light pressure resultant force and moment as a tensor series

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In the paper Nerovny et al. (2017), the commentaries about a convergence of series which represent the absolute value function and corresponding equations contain several mistakes (Sect. 2, from Eqs. (4) to (6)).

The series Eq. (3)

$$|\hat{\mathbf{n}} \cdot \hat{\mathbf{s}}| = |x| = \frac{2}{\pi} - \frac{4}{\pi} \sum_{n=1}^{\infty} \frac{(-1)^n T_{2n}(x)}{-1 + 4n^2}$$

of Chebyshev polynomials of the first kind for $|\hat{\mathbf{n}} \cdot \hat{\mathbf{s}}| = |x| \leq 1$ is absolutely convergent. If we define $x = \cos y$, than $T_{2n} = \cos 2ny$, $|T_{2n}| \leq 1$, and we get the ordinary Fourier series

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which is majorizable by the following convergent series:

$$\frac{2}{\pi} - \frac{4}{\pi} \sum_{n=1}^{\infty} \frac{1}{-1 + 4n^2}.$$

Additionally, for any x the original series is an alternating Leibniz series. Its partial sum differs from $|x|$ less or equal than the absolute value of the first neglected term.

These are the steps to produce a power series of absolute value function from Eq. (3):

$$|\hat{\mathbf{n}} \cdot \hat{\mathbf{s}}| = -\lim_{N_{\max} \to \infty} \frac{4}{\pi} \sum_{n=1}^{N_{\max}} \sum_{k=0}^{n-1} \frac{(-1)^n (-1)^k n (2n - k - 1)!}{(-1 + 4n^2) k! (2n - 2k)!} 4^{n-k} (\hat{\mathbf{n}} \cdot \hat{\mathbf{s}})^{2(n-k)} =$$

(let $m = n - k$)

$$= -\lim_{N_{\max} \to \infty} \sum_{m=1}^{N_{\max}} \frac{(-1)^m 4^{m+1}}{\pi (2m)!} \sum_{n=m}^{N_{\max}} \frac{n (n + m - 1)!}{(-1 + 4n^2)(n - m)!} (\hat{\mathbf{n}} \cdot \hat{\mathbf{s}})^{2m}.$$

That's why the Eqs. (4) and (5) from Nerovny et al. (2017) should be written as follows:

$$|\hat{\mathbf{n}} \cdot \hat{\mathbf{s}}| = \lim_{N_{\max} \to \infty} \sum_{m=1}^{N_{\max}} B_m (\hat{\mathbf{n}} \cdot \hat{\mathbf{s}})^{2m} \approx \sum_{m=1}^{N_{\max}} B_m (\hat{\mathbf{n}} \cdot \hat{\mathbf{s}})^{2m},$$

$$B_m \approx -\frac{(-1)^m 4^{m+1}}{\pi (2m)!} \sum_{n=m}^{N_{\max}} \frac{n (n + m - 1)!}{(-1 + 4n^2)(n - m)!},$$

and in equations for $N_{\max\, B}$, Eqs. (6) and (34), the $\lfloor (N_{\max} - 1)/2 \rfloor$ term should be replaced by $N_{\max}$.

The results of calculations in Sects. 7 and 8 are not affected by this error because in the numerical calculations we used correct relations presented in this erratum.

Reference

Nerovny, N., Zimin, V., Fedorchuk, S., Golubev, E.: Representation of light pressure resultant force and moment as a tensor series. Celest. Mech. Dyn. Astron. **128**, 483–513 (2017). doi:10.1007/s10569-017-9758-8