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ERRATUM

Erratum to: Frequency response of primary resonance of electrostatically actuated CNT cantilevers

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1. Equation (16) should be corrected as

$$\varepsilon^1 : D_0^2 w_1 + \frac{\partial^4 w_1}{\partial z^4} = -2D_0 D_1 w_0 - b^* D_0 w_0 + \delta \sum_{k=0}^{3} \alpha_k w_0^k \cos^2 \Omega^* T_0 + \mu \sum_{k=0}^{3} \lambda_k w_0^k \qquad (16)$$

2. Equation (19) should be corrected as

$$\begin{aligned} &D_0^2 w_1 + \frac{\partial^4 w_1}{\partial z^4} = -2i\omega_k \left(A' e^{i\omega_k T_0} - \overline{A}' e^{-i\omega_k T_0}\right) \phi_k \\ &- ib^* \omega_k \left(A e^{i\omega_k T_0} - \overline{A} e^{-i\omega_k T_0}\right) \phi_k \\ &+ \frac{\delta}{4} \left(e^{2i\Omega^* T_0} + 2 + e^{-2i\Omega^* T_0}\right) \\ &\left[\alpha_0 + \alpha_1 \phi_k \left(A e^{i\omega_k T_0} + \overline{A} e^{-i\omega_k T_0}\right)\right. \\ &+ \alpha_2 \phi_k^2 \left(A^2 e^{2i\omega_k T_0} + 2A\overline{A} + \overline{A}^2 e^{-2i\omega_k T_0}\right) \\ &+ \alpha_3 \phi_k^3 \left(A^3 e^{3i\omega_k T_0}\right. \\ &\left.\left. + 3A^2 \overline{A} e^{i\omega_k T_0} + 3\overline{A}^2 A e^{-i\omega_k T_0} + \overline{A}^3 e^{-3i\omega_k T_0}\right)\right] \\ &+ \mu \left[\lambda_0 + \lambda_1 \phi_k \left(A e^{i\omega_k T_0} + \overline{A} e^{-i\omega_k T_0}\right)\right. \\ &+ \lambda_2 \phi_k^2 \left(A^2 e^{2i\omega_k T_0} + 2\overline{A}A + \overline{A}^2 e^{-2i\omega_k T_0}\right) \\ &+ \lambda_3 \phi_k^3 \left(A^3 e^{3i\omega_k T_0}\right. \\ &\left.\left. + 3A^2 \overline{A} e^{i\omega_k T_0} + 3\overline{A}^2 A e^{-i\omega_k T_0} + \overline{A}^3 e^{-3i\omega_k T_0}\right)\right] \end{aligned} \qquad (19)$$

3. Equation (20) should be corrected as

$$\begin{aligned} &- 2i\omega_k g_{1kk} (A' e^{i\omega_k T_0} - \overline{A}' e^{-i\omega_k T_0}) \\ &- ib^* \omega_k g_{1kk} (A e^{i\omega_k T_0} - \overline{A} e^{-i\omega_k T_0}) \\ &+ \frac{\delta}{4} \left(e^{2i\Omega^* T_0} + e^{-2i\Omega^* T_0} + 2\right) \\ &\left[\alpha_0 g_{0kk} + \alpha_1 g_{1kk} (A e^{i\omega_k T_0} + \overline{A} e^{-i\omega_k T_0})\right. \\ &+ \alpha_2 g_{2kk} (A^2 e^{2i\omega_k T_0} + 2A\overline{A} + \overline{A}^2 e^{-2i\omega_k T_0}) \\ &+ \alpha_3 g_{3kk} (A^3 e^{3i\omega_k T_0} \\ &\left. + 3A^2 \overline{A} e^{i\omega_k T_0} + 3A\overline{A}^2 e^{-i\omega_k T_0} + \overline{A}^3 e^{-3i\omega_k T_0})\right] \\ &+ \mu \left[\lambda_0 g_{0kk} + \lambda_1 g_{1kk} (A e^{i\omega_k T_0} + \overline{A} e^{-i\omega_k T_0})\right. \\ &+ \lambda_2 g_{2kk} (A^2 e^{2i\omega_k T_0} + 2A\overline{A} + \overline{A}^2 e^{-2i\omega_k T_0}) \\ &+ \lambda_3 g_{3kk} (A^3 e^{3i\omega_k T_0} + 3A^2 \overline{A} e^{i\omega_k T_0} \\ &\left. + 3A\overline{A}^2 e^{-i\omega_k T_0} + \overline{A}^3 e^{-3i\omega_k T_0})\right] = 0 \end{aligned} \qquad (20)$$

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4. Equation (22) should be corrected as

$$
\begin{aligned}
&-2i\omega_k g_{1kk}A' - ib^*\omega_k g_{1kk}A\\
&+\frac{\delta}{4}\cdot 2\left[\alpha_1 g_{1kk}A + 3\alpha_3 g_{3kk}A^2\overline{A}\right]\\
&+\mu\left[\lambda_1 g_{1kk}A + 3\lambda_3 g_{3kk}A^2\overline{A}\right]\\
&+\text{“}other\ secular\ terms\text{”} = 0
\end{aligned}
\tag{22}
$$

5. After Eq. (22) the text should read:
The given terms in Eq. (22) come from all terms in Eq. (25) except the ones multiplied by $e^{2i\Omega^* T_0} + e^{-2i\Omega^* T_0}$. The “*other secular terms*” come from multiplying the first bracketed expression of Eq. (19) by $e^{2i\Omega^* T_0} + e^{-2i\Omega^* T_0}$.
6. Equation (23) should be corrected

$$
\begin{aligned}
&\frac{\delta}{4}\left\{\alpha_0 g_{0kk}(e^{2i\Omega^* T_0} + e^{-2i\Omega^* T_0})\right.\\
&+\alpha_1 g_{1kk}(Ae^{i(\omega_k+2\Omega^*)T_0}\\
&+Ae^{i(\omega_k-2\Omega^*)T_0} + \overline{A}e^{-i(\omega_k-2\Omega^*)T_0}\\
&+\overline{A}e^{-i(\omega_k+2\Omega^*)T_0})\\
&+\alpha_2 g_{2kk}\left(A^2e^{2i(\omega_k+\Omega^*)T_0} + 2A\overline{A}e^{2i\Omega^* T_0}\right.\\
&+\overline{A}^2e^{-2i(\omega_k-\Omega^*)T_0}\\
&+A^2e^{2i(\omega_k-\Omega^*)T_0} + 2A\overline{A}e^{-2i\Omega^* T_0}\\
&\left.+\overline{A}^2e^{-2i(\omega_k+\Omega^*)T_0}\right)\\
&+\alpha_3 g_{3kk}\left[A^3e^{i(3\omega_k+2\Omega^*)T_0}\right.\\
&+3A^2\overline{A}e^{i(\omega_k+2\Omega^*)T_0} + 3A\overline{A}^2e^{-i(\omega_k-2\Omega^*)T_0}\\
&+\overline{A}^3e^{-i(3\omega_k-2\Omega^*)T_0} + A^3e^{i(3\omega_k-2\Omega^*)T_0}\\
&+3A^2\overline{A}e^{i(\omega_k-2\Omega^*)T_0} + 3A\overline{A}^2e^{-i(\omega_k+2\Omega^*)T_0}\\
&\left.\left.+\overline{A}^3e^{-i(3\omega_k+2\Omega^*)T_0}\right]\right\} = 0
\end{aligned}
\tag{23}
$$

7. The first two sentences to include Eq. (24) in Sect. 5 should be corrected as
The frequency of AC actuation is near half natural frequency $\Omega^* \cong \omega_k/2$. This can be written as

$$\Omega^* = \frac{\omega_k}{2} + \varepsilon\sigma \tag{24}$$

where σ is a detuning parameter and $\Omega^* T_0 = \omega_k T_0/2 + \sigma T_1$.

8. Equation (28) should be corrected as

$$
\begin{aligned}
&-2i\omega_k\left(\frac{1}{2}a'e^{i\beta} + i\frac{1}{2}a\beta'e^{i\beta}\right)g_{1kk}\\
&-ib^*\omega_k\frac{1}{2}ae^{i\beta}g_{1kk}\\
&+\frac{\delta}{2}\left(\alpha_1\frac{1}{2}ae^{i\beta}g_{1kk} + \alpha_3 g_{3kk}\frac{3}{8}a^3e^{i\beta}\right)\\
&+\mu\left(\lambda_1\frac{1}{2}ae^{i\beta}g_{1kk} + \lambda_3 g_{3kk}\frac{3}{8}a^3e^{i\beta}\right)\\
&+\frac{\delta}{4}\left(\alpha_2 g_{2kk}\frac{1}{4}a^2\right)e^{2i\beta-2i\sigma T_1}\\
&+\frac{\delta}{4}\left(\alpha_0 g_{0kk} + \alpha_2 g_{2kk}\frac{1}{2}a^2\right)e^{2i\sigma T_1} = 0
\end{aligned}
\tag{28}
$$

9. Equation (29) should be corrected as

$$
\begin{aligned}
&-i\omega_k\left(a' + ai\beta'\right)g_{1kk} - ib^*\omega_k\frac{1}{2}ag_{1kk}\\
&+\frac{\delta}{2}\left(\alpha_1\frac{1}{2}ag_{1kk} + \alpha_3 g_{3kk}\frac{3}{8}a^3\right)\\
&+\mu\left(\lambda_1\frac{1}{2}ag_{1kk} + \lambda_3 g_{3kk}\frac{3}{8}a^3\right)\\
&+\frac{\delta}{16}\left(\alpha_2 g_{2kk}a^2\right)e^{i\beta-2i\sigma T_1}\\
&+\frac{\delta}{4}\left(\alpha_0 g_{0kk} + \alpha_2 g_{2kk}\frac{1}{2}a^2\right)e^{2i\sigma T_1-i\beta} = 0
\end{aligned}
\tag{29}
$$

10. Equation (30) should be corrected as

$$\gamma = 2\sigma T_1 - \beta \tag{30}$$

11. Equation (32) should be corrected as

$$
\begin{aligned}
&\gamma' = 2\sigma + \frac{\delta}{\omega_k}\left(\alpha_1\frac{1}{4} + \alpha_3\frac{g_{3kk}}{g_{1kk}}\frac{3}{16}a^2\right)\\
&+\frac{\mu}{\omega_k}\left(\lambda_1\frac{1}{2} + \lambda_3\frac{g_{3kk}}{g_{1kk}}\frac{3}{8}a^2\right)\\
&+\frac{\delta}{\omega_k}\alpha_2\frac{g_{2kk}}{g_{1kk}}\frac{1}{16}a\cos\gamma\\
&+\frac{\delta}{\omega_k}\left(\frac{\alpha_0}{4}\frac{g_{0kk}}{g_{1kk}a} + \alpha_2\frac{g_{2kk}}{g_{1kk}}a\frac{1}{8}\right)\cos\gamma
\end{aligned}
\tag{32}
$$

12. Equation (34) should be corrected as

$$\begin{aligned}\sigma = &-\frac{\delta}{\omega_k}\left(\alpha_1\frac{1}{8}+\alpha_3\frac{g_{3kk}}{g_{1kk}}\frac{3}{32}a^2\right)\\ &-\frac{\mu}{\omega_k}\left(\lambda_1\frac{1}{4}+\lambda_3\frac{g_{3kk}}{g_{1kk}}\frac{3}{16}a^2\right)\\ &-\frac{\delta}{\omega_k}\alpha_2\frac{g_{2kk}}{g_{1kk}}\frac{1}{32}a\cos\gamma\\ &-\frac{\delta}{\omega_k}\left(\frac{\alpha_0}{8}\frac{g_{0kk}}{g_{1kk}a}+\alpha_2\frac{g_{2kk}}{g_{1kk}}a\frac{1}{16}\right)\cos\gamma \qquad (34)\end{aligned}$$