CORRECTION

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Correction to: Green's functions for the magneto-electro-elastic anisotropic half-space and their applications to contact and crack problems

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The following text should be changed in the abstract:

Using the theory of generalized functions, some basic parameters at the half-space boundary are defined in a finite form, and no computation of any integral is needed. Knowledge of some of the Green's functions in finite form allows us to derive the governing integral equations for the normal contact and crack problems, as well as to establish certain relationship between the integrands in Fourier transforms of the kernels of the relevant integral equations.

Text after equation (17) up to and including equation (24) should be replaced by:

In order to better visualize (17) we may deduce that

$$\sum_{s=1}^5 \mathcal{X}_{ks} (-1)^{n+s} D_c^{(n,s)} = D_{\text{cnk}}, \quad (18)$$

which is the determinant of the matrix $\mathcal{C}$ (see 11–12) with the n th row replaced by $\mathcal{X}_{ks}$. Now (17) can be rewritten as

$$u_k(x_1, x_2, 0) = \frac{1}{4\pi^2} \int_0^{2\pi} \int_0^\infty \sum_{n=1}^5 \alpha_n \frac{D_{\text{cnk}}(\vartheta)}{D_c(\vartheta)} \exp[-i\rho(x_1 \cos \vartheta + x_2 \sin \vartheta)] d\rho d\vartheta. \quad (19)$$

Since ρ enters only the exponential, we can use the theory of generalized functions to get

$$\int_0^\infty \exp[-i\rho(x_1 \cos \vartheta + x_2 \sin \vartheta)] d\rho = \pi \delta(x_1 \cos \vartheta + x_2 \sin \vartheta) - \mathcal{P} \left(\frac{i}{x_1 \cos \vartheta + x_2 \sin \vartheta} \right). \quad (20)$$

Here $\delta(\cdot)$ is the Dirac delta-function and $\mathcal{P}$ stands for the principal value. The following property of delta-functions can be found in (Krein 1972)

$$\delta[f(\vartheta)] = \sum_n \frac{\delta(\vartheta - \vartheta_n)}{|f'(\vartheta_n)|}, \quad (21)$$

The original article can be found online at <https://doi.org/10.1007/s00419-017-1293-2>.

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where ϑ_n are all the roots of equation $f(\vartheta) = 0$. In our case, we have 2 roots in the interval $0 \leq \vartheta < 2\pi$

$$\vartheta_1 = \pi - \tan^{-1}(x_1/x_2), \quad \vartheta_2 = 2\pi - \tan^{-1}(x_1/x_2) \quad (22)$$

with

$$|f'(\vartheta_1)| = |f'(\vartheta_2)| = \sqrt{x_1^2 + x_2^2}. \quad (23)$$

Now the final result will take the form

$$\begin{aligned} u_k(x_1, x_2, 0) = & \frac{1}{4\pi} \left[\sum_{n=1}^5 \alpha_n \left(\frac{D_{\text{cnk}}(-x_2, x_1)}{D_c(-x_2, x_1)} + \frac{D_{\text{cnk}}(x_2, -x_1)}{D_c(x_2, -x_1)} \right) \right] \\ & - \frac{i}{4\pi^2} \mathcal{P} \int_0^{2\pi} \sum_{n=1}^5 \alpha_n \frac{D_{\text{cnk}}(\vartheta) d\vartheta}{D_c(\vartheta)(x_1 \cos \vartheta + x_2 \sin \vartheta)}. \end{aligned} \quad (24)$$

Here each parameter with the arguments $(-x_2, x_1)$ is understood as similar parameter in the article with ξ_1 formally replaced by $-x_2$ and ξ_2 is replaced by x_1 . Numerical computations show that

$$\begin{aligned} \text{Re}[D_{\text{cnk}}(\vartheta)/D_c(\vartheta)] &= \text{Re}[D_{\text{cnk}}(\vartheta + \pi)/D_c(\vartheta + \pi)], \quad \text{Im}[D_{\text{cnk}}(\vartheta)/D_c(\vartheta)] \\ &= -\text{Im}[D_{\text{cnk}}(\vartheta + \pi)/D_c(\vartheta + \pi)] \end{aligned} \quad (24a)$$

and

$$\text{Im}[D_{\text{cnk}}(\vartheta)/D_c(\vartheta) + D_{\text{ckn}}(\vartheta)/D_c(\vartheta)] = 0, \quad \text{Im}[D_{\text{cnn}}(\vartheta)/D_c(\vartheta)] = 0. \quad (24b)$$

Here symbols Re and Im stand for the real and imaginary part, respectively. These properties allow us to conclude that the principal value of the integral of the $\text{Re}[D_{\text{cnk}}(\vartheta)/D_c(\vartheta)]$ in the right-hand side of (24) is zero, while the principal value of the same integral of the $\text{Im}[D_{\text{cnk}}(\vartheta)/D_c(\vartheta)]$ is zero in the case $n = k$, so that final result in (24) is always real, as it should be. We can also conclude that the matrix $\{D_{nk}\} = \{D_{\text{cnk}}(\vartheta)/D_c(\vartheta)\}$ is Hermitian with D_{nk} equal to the complex conjugate of D_{kn} and the diagonal being real.

In the first paragraph of the section 4, the sentence “There is also no outside electrical or magnetic interference” should be replaced by:

“The outside electrical or magnetic parameters are chosen in such a way that the mechanical boundary conditions, described above, hold.”

Equations (52) and (53) should read:

$$K_{12}(x_1, x_2) = \frac{1}{4\pi} \left(\frac{D_{12}(-x_2, x_1)}{D_c(-x_2, x_1)} + \frac{D_{12}(x_2, -x_1)}{D_c(x_2, -x_1)} \right) - \frac{i}{4\pi^2} \mathcal{P} \int_0^{2\pi} \frac{D_{12}(\vartheta) d\vartheta}{D_c(\vartheta)(x_1 \cos \vartheta + x_2 \sin \vartheta)}. \quad (52)$$

$$K_{21}(x_1, x_2) = \frac{1}{4\pi} \left(\frac{D_{21}(-x_2, x_1)}{D_c(-x_2, x_1)} + \frac{D_{21}(x_2, -x_1)}{D_c(x_2, -x_1)} \right) - \frac{i}{4\pi^2} \mathcal{P} \int_0^{2\pi} \frac{D_{21}(\vartheta) d\vartheta}{D_c(\vartheta)(x_1 \cos \vartheta + x_2 \sin \vartheta)}. \quad (53)$$

The last paragraph before section Discussion and unnumbered equation should be replaced by:

Numerical computations show the same properties hold for the ratios D_{nk}^0/D_{crt} , as in (24a–24b). Taking into consideration that D_{nk}^0 in (63–66) are homogeneous with respect to ξ_1 and ξ_2 of the order 4 and D_{crt} is homogeneous of the order 3, we may conclude that the integrals (63–66) are divergent. They can be regularized and computed, as it was done in (36–38), except that now for the kernels K_{nk} with $n \neq k$ we shall need to compute the principal value of the integral, similar to (52–53).