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CORRIGENDUM

The low frequency scalar diffraction by an elliptic disc

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The above-named article contains algebraic errors in the terms of certain series, particularly in the expressions for the far field amplitude f and Scattering Cross-section. The correct results together with the corresponding equation numbers of the original paper are listed below.

$$\omega_1(P_1) = ikL\left\{\frac{uF_0^0(\gamma_1)\,\mathrm{sn}\,\gamma_1}{uF_0^0(K+iK')} + \frac{uE_0^0(K+iK')\,uF_0^0(\gamma_1)}{\{uE_0^0(0)\}^2\{uF_0^0(K+iK')\}^2} - \frac{uE_0^0(\gamma_1)}{\{uE_0^0(0)\}^2\,uF_0^0(K+iK')}\right\}. \tag{4·2}$$

$$\begin{aligned}
\omega_2(P_1) = &-\frac{k^3L^2}{uF_0^0(K+iK')}\left\{\frac{A_{0,1}^{(u)}\,uF_2^0(\gamma_1)}{uEp_2^0(0,0)}\,\frac{\lambda^2}{\bar\lambda-\lambda}\int_{k+ik'}^{\gamma_1} uF_0^0(\gamma)\,uE_2^0(\gamma)\,\mathrm{sn}^2\gamma\,d\gamma\right.\\
&-\frac{A_{1,1}^{(u)}\,uF_2^1(\gamma_1)}{uEp_2^1(0,0)}\,\frac{\bar\lambda^2}{\bar\lambda-\lambda}\int_{K+iK'}^{\gamma_1} uF_0^0(\gamma)\,uE_2^1(\gamma)\,\mathrm{sn}^2\gamma\,d\gamma\\
&+\frac{A_{0,1}^{(u)}\,uE_2^0(\gamma_1)}{uEp_2^0(0,0)}\,\frac{\lambda^2}{\bar\lambda-\lambda}\int_{\gamma_1}^{iK'} uF_0^0(\gamma)\,uF_2^0(\gamma)\,\mathrm{sn}^2\gamma\,d\gamma\\
&\left.-\frac{A_{1,1}^{(u)}\,uE_2^1(\gamma_1)}{uEp_2^1(0,0)}\,\frac{\bar\lambda^2}{\lambda-\bar\lambda}\int_{\gamma_1}^{iK'} uF_0^0(\gamma)\,uF_2^1(\gamma)\,\mathrm{sn}^2\gamma\,d\gamma\right\}\\
&+k^3L^2\left\{A_{0,1}^{(u)}\frac{uF_2^0(\gamma_1)}{uEp_2^0(0,0)}\,\frac{\lambda^2\bar\lambda}{\lambda-\bar\lambda}\int_{K+iK'}^{\gamma_1} uE_2^0(\gamma)\,uF_0^0(\gamma)\,d\gamma\right.\\
&-A_{1,1}^{(u)}\frac{uF_2^1(\gamma_1)}{uEp_2^1(0,0)}\,\frac{\lambda\bar\lambda^2}{\bar\lambda-\lambda}\int_{K+iK'}^{\gamma_1} uE_2^1(\gamma)\,uF_0^0(\gamma)\,d\gamma\\
&+A_{0,1}^{(u)}\frac{uE_2^0(\gamma_1)}{uEp_2^0(0,0)}\,\frac{\lambda^2\bar\lambda}{\bar\lambda-\lambda}\int_{\gamma_1}^{iK'} uF_2^0(\gamma)\,uF_0^0(\gamma)\,d\gamma\\
&\left.-A_{1,1}^{(u)}\frac{uE_2^1(\gamma_1)}{uEp_2^1(0,0)}\,\frac{\lambda\bar\lambda^2}{\bar\lambda-\lambda}\int_{\gamma_1}^{iK'} uF_2^1(\gamma)\,uF_0^0(\gamma)\,d\gamma\right\}\\
&+\frac{kL^2A_{0,0}^{(u)}}{uEp_0^0(0,0)}\left\{\frac{2}{3}\,\frac{uF_0^0(\gamma_1)\,uF_0'^0(\gamma_1)\,uE_0^0(\gamma_1)}{uF_0^0(K+iK')}\,\mathrm{sn}^2\gamma_1\right.\\
&-\frac{2}{3k^2}\,\frac{uE_0^0(K+iK')\,uF_0'^0(K+iK')\,uF_0^0(\gamma_1)}{uF_0^0(k+iK')}
\end{aligned}$$

$$+\frac{uF_0^0(\gamma_1)\,uF_0'^0(\gamma_1)\,\mathrm{sn}\,\gamma_1}{\{uF_0^0(K+iK')\}^2}-\frac{uF_0'^0(\gamma_1)\,\mathrm{sn}\,\gamma_1}{uF_0^0(K+iK')}-\frac{k}{\{uE_0^0(0)\}^2\{uF_0^0(K+iK')\}^2}$$
$$+\frac{kuF_0^0(\gamma_1)}{\{uF_0^0(K+K')\}^3\{uE_0^0(0)\}^2}-\frac{1}{3k^2}\frac{uE_0^0(\gamma_1)\{uF_0'^0(\gamma_1)\}^2\{\gamma_1-E(\gamma_1)\}}{uF_0^0(K+iK')}$$
$$+\tfrac{1}{3}uE_0^0(K+iK')\frac{\{uF_0'^0(\gamma_1)\}^2}{k^2\{uF_0^0(K+iK')\}^2}uF_0^0(\gamma_1)\{K+iK'-E(K+iK')\}\Bigg\}$$
$$+\frac{L^2}{2}\left\{\frac{uEp_0^0(\alpha_1,\beta_1)\,uF_0^0(\gamma_1)}{uEp_0^0(0,0)\,uF_0^0(K+iK')}[(1-k^2m^2)+k^2(l^2-m^2)\lambda\bar{\lambda}+k^2m^2(\lambda+\bar{\lambda})]\right\}. \tag{4·3}$$

$$f_s=|\chi kL\Bigg[-\frac{1}{uE_0^0(0)\,uF_0^0(K+iK')}+\frac{i\chi kL}{\{uE_0^0(0)\}^2\{uF_0^0(K+iK')\}^2}$$
$$+\frac{k^2L^2\chi^2}{uF_0^0(K+iK')}\left\{\frac{uEp_2^0(\alpha,\beta)}{uE_0^0(0)\,uEp_2^0(0,0)}\frac{\lambda^2}{6(\bar{\lambda}-\lambda)}-\frac{uEp_2^1(\alpha,\beta)}{uE_0^0(0)\,uEp_2^1(0,0)}\frac{\bar{\lambda}^2}{6(\bar{\lambda}-\lambda)}\right.$$
$$+\frac{uEp_0^0(\alpha,\beta)}{uEp_0^0(0,0)}\left(\frac{1}{\{uF_0^0(K+iK')\}^2\{uE_0^0(0)\}^3}-\frac{(1+k^2)}{18k^2uE_0^0(0)}+\frac{K-E-iE'}{3k\{uE_0^0(0)\}^2uF_0^0(K+iK')}\right.$$
$$\left.\left.+\frac{1}{2kuE_0^0(0)}[k^2(l^2-m^2)\lambda\bar{\lambda}+k^2m^2(\lambda+\bar{\lambda})-k^2m^2-\tfrac{1}{3}]\right)\right\}+O(\chi^3)\Bigg]. \tag{5·3}$$

$$\sigma=\frac{4\pi L^2}{K^2}\Bigg[1+\chi^2L^2\Bigg\{\frac{1+k^2}{9}-\frac{2}{3}\frac{K-E}{K}$$
$$-\frac{1}{K^2}-[k^2(l^2-m^2)\lambda\bar{\lambda}+k^2m^2(\lambda+\bar{\lambda}-1)-\tfrac{1}{3}]\Bigg\}+O(\chi^4)\Bigg]. \tag{5·6}$$

The first paragraph of the subsequent conclusion becomes redundant and should be replaced by the following.

As a check on the validity of the result (5·6) we reduce the elliptic disc to a circular one. This is simply achieved by letting $k \to 0$. Thus in this limiting case we obtain, on putting either

$$l=\sin\gamma,\quad m=0,\quad n=\cos\gamma,$$

or

$$l=0,\quad m=\sin\gamma,\quad n=\cos\gamma,$$

$$\sigma=\frac{16L^2}{\pi}\left[1+\chi^2L^2\left(\frac{\pi^2-36+3\pi^2\cos^2\gamma}{9\pi^2}\right)+O(\chi^4)\right].$$

This result is seen to agree with that given by Bazer and Hochstadt (1). Further we remark that (5·6) is also in agreement with the corresponding result given by Williams (2), who has considered the same problem using a variational method.

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(2) WILLIAMS, W. E. To be published (1970).