

Erratum for the arbitrary shape cloak formula

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In his paper "Exact analytical approaches for elliptic cylindrical invisibility cloaks", Vol. 26, No. 5/May 2009/J. Opt. Soc. Am. B, pp. 1119–1128, C. Cojocaru has judiciously indicated on p. 1126 that the following formula from A. Nicolet, F. Zolla, and S. Guenneau, "Electromagnetic analysis of cylindrical cloaks of an arbitrary cross section," Opt. Lett. 33, 15841586 (2008) is not correct :

$$c_{12}(\rho', \theta') = (\rho' - R_2(\theta'))R_2(\theta')\frac{dR_1(\theta')}{d\theta'} - \frac{(\rho' - R_1(\theta'))R_1(\theta')\frac{dR_2(\theta')}{d\theta'}}{(R_2(\theta') - R_1(\theta'))^2} \quad (1)$$

since the denominator $(R_2(\theta') - R_1(\theta'))^2$ is erroneously missing in the first term on the right-hand side. Indeed, a first year student can see that this formula has not coherent dimensional units! The correct formula is :

$$c_{12}(\rho', \theta') = \frac{(\rho' - R_2(\theta'))R_2(\theta')\frac{dR_1(\theta')}{d\theta'} - (\rho' - R_1(\theta'))R_1(\theta')\frac{dR_2(\theta')}{d\theta'}}{(R_2(\theta') - R_1(\theta'))^2} \quad (2)$$

Fortunately, the formula was correctly computed and correctly encoded in the numerical models and is limited to a misprint in text of the paper. All the computations have been performed with the correct formula and this is probably one of the reasons why it has not been detected!

A small error in \LaTeX may have dramatic consequences in the resulting output. Unfortunately this error has propagated in subsequent papers about transformation electromagnetics, a drama of feather-brained "copy and paste" ("Geometrical transformations and equivalent materials in computational electromagnetism" (A. Nicolet, F. Zolla, Y. Ould Agha, S. Guenneau), COMPEL, vol. 27, no. 4, pp. 806-819 (2008) and Metamaterials and Plasmonics: Fundamentals, Modelling, Applications (Saïd Zouhdi, Ari Sihvola, and Alexey Vinogradov, Editors), "Geometrical Transformations for Numerical Modelling and for New Material Design in Photonics" (in Part II, Transformation Media and Cloaking), André Nicolet, Frédéric Zolla, Yacoub Ould Agha, and Sébastien Guenneau, pp. 49-62, Springer-Verlag Berlin Heidelberg New York, 2009, ISBN 978-1-4020-9406-4)

My coauthors and myself, we apologize for this mistake.