LETTERS TO THE EDITOR

REMARK ON V. K. BODULINSKII'S AND Yu. A MEDVEDEV'S LETTER "ELECTROMAGNETIC DISTURBANCES CAUSED BY AN EXPANDING IDEALLY CONDUCTING SPHERE IN A MAGNETIC FIELD"

An article published earlier [1] contains the following estimate of an article of mine [2] ["Problem of electromagnetic oscillations appearing in response to rapid expansion of an ideally conducting sphere discussed in [2], where an erroneous result is arrived at (the solution does not satisfy the original Maxwell equations)"]. Apparently, following out the logic of this assertion, V. K. Bodulinskii and Yu. A. Medvedev pose exactly the same problem in their article that was considered in my earlier article [2].

It is worth noting the following in this connection:

1) Electromagnetic disturbances outside of an ideally conducting sphere, under the conditions considered, coincide with the very familiar field of a variable magnetic dipole, but no special point of this is made in the text of [1]. Consequently, the author of [2] found it possible to characterize the field by the magnitude of an equivalent dipole moment, rather than writing out the components of the electromagnetic fields obtained in a trivial manner. For that reason, the article [2] contains no formulas at all relevant to the question of whether or not the Maxwell equations are satisfied. The only exceptions are Eqs. (4) and (5), found in textbooks on electrodynamics.

2) Nevertheless, the article [2] does not contain the necessary basic remarks on the procedure for calculating the fields. This is even more interesting in that calculations of the energy balance – Eqs. (11) and (12) – include as an inevitable intermediary stage finding the field vectors. V. K. Bodulinskii and Yu. A. Medvedev lapsed into an oversight: a more attentive approach to article [2] would have made it possible to extract, without any special effort, the basic result contained in Eqs. (2.11) of [1] from Eq. (7) for the dipole moment and from the rule governing the propagation of the phase of the wave, Eq. (8).

3) The method used to describe the wave processes outside the sphere of variable radius immersed in a uniform field (and relying on dipole fields for the description) is simple and more general than the approach used in [1]. This method, by the way, was first proposed in a paper by M. A. Leontovich, the existence of which the present author was not yet aware when [2] was published, and he now considers it his duty to make mention of that fact.

LITERATURE CITED

1. V. K. Bodulinskii and Yu. A. Medvedev, "Electromagnetic disturbances caused by an expanding ideally conducting sphere in a magnetic field," Zh. Prikl. Mekhan. i Tekh. Fiz., No. 6, 102 (1969).
2. V. N. Krasil'nikov, "Study of electromagnetic waves of an ideally conducting sphere pulsating in a uniform field," in: Topics in Wave Diffraction and Propagation [in Russian], No. 4, Izd-vo LGU (1965).

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