

Response to “Comment on ‘An exactly solvable two-body problem with retarded interactions and radiation reaction in classical electrodynamics’” [J. Math. Phys. 39, 5663 (1998)]

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Citation: *Journal of Mathematical Physics* **39**, 5664 (1998); doi: 10.1063/1.532558

View online: <http://dx.doi.org/10.1063/1.532558>

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Response to “Comment on ‘An exactly solvable two-body problem with retarded interactions and radiation reaction in classical electrodynamics’ ”

[J. Math. Phys. 39, 5663 (1998)]

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(Received 28 January 1998; accepted for publication 7 April 1998)

[S0022-2488(98)02710-8]

In his comment¹ Hnizdo brings to our knowledge a previous work² in which the rate of radiation of two identical charges moving with constant angular speed at opposite ends of a diameter is numerically evaluated. Although this calculation is related to part of our paper, our work is based on a more general framework, since it deals with the construction of an exact solution of the Lorentz–Dirac equation, where the external fields that make the motion possible, and their sources are studied in detail.

Regarding the calculation of the rate of radiation, Hnizdo refers to a paper by Jordan.³ This work starts from a formula given in Jackson’s book,⁴ where the rate of radiation is expressed in terms of Bessel functions as a sum of the power radiated in the different harmonics. On the other hand, we work directly with the Liénard–Wiechert retarded fields and obtain an alternative representation for the power radiated [see our Eq. (3.27)]. Our method seems to be simpler, since it avoids tedious manipulations of Bessel functions in order to evaluate the rate of radiation.

¹V. Hnizdo, J. Math. Phys. **39**, 5663 (1998).

²V. Hnizdo, Phys. Lett. A **129**, 426 (1988).

³W. B. Jordan, SIAM (Soc. Ind. Appl. Math.) Rev. **32**, 150 (1990); misprints corrected in **34**, 126 (1992).

⁴J. D. Jackson, *Classical Electrodynamics* (Wiley, New York, 1975), Problem 14.12.