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Kinematics of a point-like charge particle in nontrivial nonhomogeneous electric fields of charged washers

Haiduke Sarafian [has2@psu.edu]

Physics Department, The Pennsylvania State University, University College

In this research-oriented passage, first, we explore the electric field of various charged commonly used circular washers. The scope of the study is extended by exploring non-common rectangular washers. Thirdly, by combining the circular and rectangular curved washers, an unusual washer is designed to explore its electric field; see figures. The second exploration segment focuses on the kinematics of a point-like charged particle within the mentioned fields. The complicated mathematical issues of the second and third mentioned cases are ironed out by applying a Computer Algebra System (CAS), namely, Mathematica[1],[2],[3]. Taking advantage of the crafted numeric solutions of the changeling differential equations, various phase diagrams are constructed supporting the intuitively predicted outputs are just. All the used Mathematica codes are embedded, making the reproductions of the report reproducible.

Keywords
Electric Field, Non-common Curved Rectangular Washer, Computer Algebra System, Mathematica

References
[1] Title. Mathematica 14.1 http://Wolfram.com
[2] Wolfram, S. (2003) The Mathematica Book. 5th Edition, Cambridge University Publications, Cambridge).
[3] Sarafian, H. (2024) American Journal of Computational Mathematics, 14, 240-247