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**Equilibrium, regular polygons, and Coulomb-type dynamics in different dimensions.** (English) [Zbl 1478.78020](#)

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Summary: The equation of motion in  $\mathbb{R}^d$  of  $n$  generalized point charges interacting via the  $s$ -dimensional Coulomb potential, which contains for  $d = 2$  a constant magnetic field, is considered. Planar exact solutions of the equation are found if either negative  $n - 1 > 2$  charges and their masses are equal or  $n = 3$  and the charges are different. They describe a motion of negative charges along identical orbits around the positive immobile charge at the origin in such a way that their coordinates coincide with vertices of regular polygons centered at the origin. Bounded solutions converging to an equilibrium in the infinite time for the considered equation without a magnetic field are also obtained. A condition permitting the existence of such solutions is proposed.

**MSC:**

[78A35](#) Motion of charged particles

[35A01](#) Existence problems for PDEs: global existence, local existence, non-existence

[35Q60](#) PDEs in connection with optics and electromagnetic theory

**Keywords:**

equation of motion; interacting point charges; Coulomb potential

**Full Text:** [DOI](#)

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