EARNSHAW'S THEOREM IN ELECTROSTATICS

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Abstract. Earnshaw's Theorem (1842) is the subject of Section 116 of Maxwell's Treatise. It asserts that charged bodies in an electrostatic field cannot be in a position of stable equilibrium. His and modern physics texts proofs are interesting but not proofs.

For point charges the result was proved by Kozlov in 1986. The case of dielectric and perfectly conducting bodies is current work with Gregoire Allaire. The interesting cases are when the linearization is degenerate. For dielectric and perfectly conduction bodies we prove that this can occur only when the electric field is constant on a neighborhood of the body.