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Introducing Pohozaev's identity and its use for PDE's

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Abstract

The Pohozaev identity is a very useful feature in the study of nonlinear elliptic partial differential equations, offering insights into the interplay between variational principles, domain geometry, and scaling invariance. In this talk, we explore the role of this identity, beginning with its classical application, known as the Pohozaev obstruction, that establishes non-existence for certain solutions on star-shaped domains. We will explain the mechanics behind the identity i.e. how its connection to the scaling symmetry of variational problems leads to constraints on solutions. We will also illustrate its utility through the case of ongoing research where the identity is employed to derive key features of a problem, bridging geometric and analytic properties of a PDE

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