

Optimal Liouville theorem for a semilinear Ornstein-Uhlenbeck equation

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Abstract

In their seminal 1985 paper Giga and Kohn analysed the blow-up behaviour of the sub-critical Fujita equation through a Liouville theorem for an associated elliptic equation of Ornstein-Uhlenbeck type. In a subsequent work Giga provided a conditional extension of this Liouville theorem to a natural broader class of semilinear Ornstein-Uhlenbeck equations and posed a question of its unconditional validity, i.e. in the class of bounded entire solutions. In this talk we will show that indeed such a result holds. The key ingredient of the demonstration relies on a generalisation of the Rellich-Pohozaev type argument which employs a family of special multipliers based on Kummer functions.