

On the maximum principle for the fractional polylaplacian

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Abstract: It is well-known that in general operators of order four do not satisfy a maximum principle for supersolutions. Since maximum principles are an important tool in the analysis of partial differential equations, the question arises why and when this property is lost for operators of order between 2 and 4. In this talk we will analyze real, positive powers of the Laplacian and show that whenever the power is in an Intervall starting with an odd number, then the maximum principle fails. By the structure of the explicit counterexample it follows that such powers of the fractional Laplacian may satisfy a maximum principle only for solutions in certain connected sets. One of such sets is given by the ball, where the maximum principle follows from an explicit solution formula given by Boggio's formula. The talk is based on a joint work with Nicola Abatangelo and Alberto Saldana.