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Conformal invariants measuring the best constants for Gagliardo-Nirenberg-Sobolev inequalities.

In 2002, Del Pino and Dolbeault computed the best constants for a certain family of Gagliardo-Nirenberg-Sobolev inequalities of the form $\|w\|_p \leq C \|\nabla w\|_2^\theta \|w\|_q^{1-\theta}$ on \mathbb{R}^n , and moreover, showed that the extremal functions are powers of the extremals for the familiar case $p = 2n/(n-2)$. We introduce conformal invariants defined on smooth metric measure spaces which recover these sharp constants on Euclidean space, and use this perspective to characterize the special family found by Del Pino and Dolbeault. If time allows, we will also comment on the Yamabe-type problem of finding functions which minimize these invariants. (Received September 08, 2012)