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An overdetermined problem for a Finsler–Laplacian

I will present some results of a recent joint paper with A. Cianchi. The purpose is to embed the famous Serrin's symmetry result (Arch. Rational Mech. Anal., 1971) in a general symmetry principle for solutions to overdetermined elliptic problems, where the relevant symmetry is not necessarily of spherical type. The underlying idea of our contribution is that a symmetry result holds for any overdetermined problem involving an elliptic operator (with quadratic growth) from a suitable class, provided that the additional boundary condition imposed on the gradient of the solution matches the structure of the differential operator. The resulting symmetry of the domain (and of the corresponding solution u) reflects, in turn, the symmetry of the operator, that is: a solution exists if and only if the domain Ω is a ball in an appropriate Finsler metric associated with the operator (moreover the level sets of u are homothetic to Ω).