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Hypoellipticity of Infinitely Degenerate Second Order Quasilinear Operators

The talk is concerned with regularity of weak solutions to second order infinitely degenerate elliptic equations. One of the ways to describe the regularity is in terms of the operator being subelliptic or hypoelliptic. A criteria of subellipticity for linear operators have been given by Fefferman and Phong in terms of subunit metric balls associated to the operator. In particular, it follows that an infinitely degenerate operator cannot be subelliptic. Hypoellipticity is a weaker property, and for a certain class of such operators has been recently shown by Rios, Sawyer and Wheeden in the a priori assumption that weak solutions are continuous. We use the subunit metric approach to show continuity of weak solutions to a certain class of degenerate quasilinear equations. This together with the result by Rios et al completes the proof of hypoellipticity of a class of infinitely degenerate quasilinear operators.