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Continuity of weak solutions via the trace method

In this talk I will discuss some new regularity results for weak solutions to infinitely degenerate elliptic equations on the plane. The main result is continuity of weak solutions for operators that have bounded measurable coefficients and are only comparable to the diagonal operator of the form $\partial_x^2 + f^2(x)\partial_y^2$, which can be seen as a generalization of Fediĭ's remarkable hypoellipticity theorem. To establish this result, we develop a trace method that first constructs a region in $\mathbb{R}^2$ on whose boundary a given subsolution u has a suitable trace, and then applies a maximum principle to derive local boundedness and continuity of weak solutions.