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Regularity theory for parabolic equations with singular degenerate coefficients

In this talk, we discuss some recent results on regularity and solvability in weighted Sobolev spaces for a class of parabolic equations in divergence form with coefficients singular or degenerate in one spatial variable. Under certain conditions, reverse Holder's inequalities are established. Lipschitz estimates for weak solutions are proved for a class of homogeneous equations whose coefficients depend only on one spatial variable, but they can be singular and degenerate. These estimates are then used to establish interior, boundary, and global estimates of the Calderon-Zygmund type for weak solutions assuming that the coefficients are partially VMO(vanishing mean oscillations) with respect to the considered weights. The solvability in weighted Sobolev spaces for this class of equations is also achieved. The obtained results are new even for elliptic equations, and they extend some recent results for uniformly elliptic and parabolic equations.

The talk is based on the joint work with H. Dong (Brown University).