SINGULAR AND DOUBLE-PHASE PROBLEMS: NEW RESULTS AND SOME PERSPECTIVES

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In this talk, I shall report on some joint works in collaboration with P. Pucci (Perugia), N. Papageorgiou (Athens) and D. Repovs (Ljubljana). I shall be concerned with several types of singular or multi-phase phenomena arising in the theory of nonlinear elliptic equations. I will describe some striking results related to the existence of blow-boundary solutions, the generalized maximum principle, and a discontinuity property of the spectrum for double-phase problems. We establish that no monotonicity hypotheses are necessary in the statement of some classical theorems. Several open problems are raised in the final part of this lecture.

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