

Monotonicity methods for asymptotics of solutions to elliptic and parabolic equations near singularities of the potential

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Abstract. The effect of singularities on profile of solutions to partial differential equations of elliptic and parabolic type will be discussed, mainly focusing on singularities generated by homogeneous potentials which, having the same order of homogeneity as the differential operator, make it invariant by scaling and can therefore be regarded as "critical" from the mathematical point of view. Local asymptotics of solutions will be investigated by a monotonicity method based on Almgren type formulas combined with blow-up methods and separation of variables; the strength of such methodology relies in the use of monotonicity to prove not only unique continuation but also precise asymptotics of solutions, by extracting such precious information from the behavior of the quotient associated with the Lagrangian energy and providing a unified approach for linear and nonlinear equations.