

Equivalence between radial solutions of different parabolic gradient-diffusion equations and applications

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Abstract. We consider a general form of a parabolic equation that generalizes both the standard parabolic p -Laplace equation and the normalized version that has been proposed in stochastic game theory. We establish an equivalence between this equation and the standard p -parabolic equation posed in a fictitious space dimension, valid for radially symmetric solutions. This allows us to find suitable explicit solutions for example of Barenblatt type, and as a consequence we settle the exact asymptotic behaviour of the Cauchy problem even for non-radial data. We also establish the asymptotic behaviour in a bounded domain. Moreover, we use the explicit solutions to establish the parabolic Harnack's inequality.

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