

ON THE LOCAL BEHAVIOR OF NON-NEGATIVE SOLUTIONS TO A LOGARITHMICALLY SINGULAR EQUATION

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The local positivity of solutions to logarithmically singular diffusion equations is investigated in some space-time domain $E \times (0, T]$. It is shown that if at some time level $t_o \in (0, T]$ and some point $x_o \in E$ the solution $u(\cdot, t_o)$ is not identically zero in a neighborhood of x_o , in a measure-theoretical sense, then it is strictly positive in a neighborhood of (x_o, t_o) . The precise form of this statement is by an intrinsic Harnack-type inequality, which also determines the size of such a neighborhood. Further results on L^1 -type Harnack estimates and analyticity of solutions are presented.