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**EXISTENCE AND REGULARITY OF SOLUTIONS TO DOUBLY
NONLINEAR DIFFUSION EQUATIONS**

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Under weak assumptions on p , m and f we prove existence and regularity of weak solutions to doubly nonlinear diffusion equations $du/dt = \operatorname{div}((\nabla u^m)^{p-1}) + f(u)$ by optimal a priori estimates for $\|u(t)\|_{r(t)}$ with a time-dependent exponent $r(t)$. These a priori estimates are obtained in an elementary way by logarithmic Gagliardo-Nirenberg inequalities and guarantee not only ultracontractivity of the generated nonlinear semigroup, but also the existence of a global attractor.

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