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Global existence for quasilinear diffusion equations in isotropic nondivergence form

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Dedicated to Herbert Amann on the occasion of his 70th birthday

Abstract. We consider the quasilinear parabolic equation

$$u_t - \beta(t, x, u, \nabla u)\Delta u = f(t, x, u, \nabla u)$$

in a cylindrical domain, together with initial-boundary conditions, where the quasilinearity operates on the diffusion coefficient of the Laplacian. Under suitable conditions we prove global existence of a solution in the energy space. Our proof depends on maximal regularity of a nonautonomous linear parabolic equation which we use to provide us with compactness in order to apply Schaefer's fixed point theorem.

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